# PROCEEDINGS

OF THE

# American Pharmaceutical Association

AT THE

## FORTIETH ANNUAL MEETING,

HELD AT PROFILE HOUSE, N. H., JULY, 1892,

ALSO THE

CONSTITUTION, BY-LAWS AND ROLL OF MEMBERS.



PHILADELPHIA:
PUBLISHED BY THE AMERICAN PHARMACEUTICAL ASSOCIATION.
1892.

# OFFICERS OF THE ASSOCIATION.

## 1892-93.

PRESIDENT.

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REPORTER ON PROGRESS OF PHARMACY.

HENRY KRAEMER . . . . . . . . . . . . . . . New York, N. Y.

# STANDING COMMITTEES.

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## COMMITTEE ON COMMERCIAL INTERESTS.

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This Committee was likewise appointed to act as a delegation to the National Wholesale Drug Association, and to aid in the plan for the prevention of cutting (see page 154).

## COMMITTEE ON SCIENTIFIC PAPERS.

C. T. P. FENNEL (Chairman) .......................................... Cincinnati, O

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## COMMITTEE ON PRIZE ESSAYS.

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## COMMITTEE ON PHARMACEUTICAL EDUCATION AND LEGISLATION.

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## COMMITTEE ON THE REVISION OF THE U. S. PHARMACOPŒIA.

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# SPECIAL COMMITTEES OF THE ASSOCIATION.

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N. GRAY BARTLETT, Chicago.
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J. M. GOOD, St. Louis, Mo.
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H. H. RUSBY, New York, N. Y.
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WM. S. THOMPSON, Washington, D. C.

The President and Permanent Secretary of the Association, *ex-officio*.

## COMMITTEE ON ARRANGEMENTS.

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C. S. N. HALLBERG, Chicago.
T. H. PATTERSON, Chicago.
D. R. DYCHE, Chicago.
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## COMMITTEE ON NATIONAL FORMULARY.

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ADAM CONRATH, Milwaukee, Wis.

And the following representatives of State (or District) Pharmaceutical Associations:

| | |
|---|---|
| *Alabama.* | Philip C. Candidus, Mobile. |
| *Arkansas.* | John B. Bond, Little Rock. |
| *California.* | Val. Schmidt, San Francisco. |
| *Colorado.* | Chas. M. Ford, Denver. |
| *Columbia, Dist.* | Samuel L. Hilton, Washington. |
| *Connecticut.* | Chas. A. Rapelye, Hartford. |
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| *Florida.* | J. M. Dixon, Titusville. |
| *Georgia.* | Geo. D. Case, Milledgeville. |
| *Illinois.* | R. E. Rhode, Chicago. |
| *Indiana.* | G. W. Sloan, Indianapolis. |
| *Iowa.* | Geo. H. Schafer, Fort Madison. |
| *Kansas.* | Lucius E. Sayre, Lawrence. |
| *Kentucky.* | Edward C. Pfingst, Louisville. |
| *Louisiana.* | R. N. Girling, New Orleans. |
| *Maine.* | N. S. Harlow, Bangor. |
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| *Massachusetts.* | Wm. W. Bartlet, Boston. |
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| *Minnesota.* | F. F. Stark, Minneapolis. |
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| *Tennessee.* | James O. Burge, Nashville. |
| *Texas.* | E. M. Wells, Fort Worth. |
| *Virginia.* | |
| *Washington.* | Henry E. Holmes, Seattle. |
| *West Virginia.* | Edwin L. Boggs, Charleston. |
| *Wisconsin.* | A. Conrath, Milwaukee. |
| *Quebec.* | Henry R. Gray, Montreal. |
| *Ontario.* | |

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(Appointed by the President.)

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Adam Conrath, Milwaukee, Wis.
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Chas. O. Curtman, St. Louis, Mo.
John A. Dadd, Milwaukee, Wis.
C. Lewis Diehl, Louisville, Ky.
C. T. P. Fennel, Cincinnati, O.
A. H. Hollister, Madison, Wis.
Lewis C. Hopp, Cleveland, O.
John N. Hurty, Indianapolis, Ind.
John Ingalls, Macon, Ga.
G. H. C. Klie, St. Louis, Mo.
M. L. H. Leavitt, Boston, Mass.
J. M. Maisch, Philadelphia, Pa.
E. L. Patch, Boston, Mass.
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Charles Rice, New York, N. Y.
H. H. Rusby, New York, N. Y.
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W. H. Torbert, Dubuque, Ia.
Wm. T. Wenzell, San Francisco, Cal.

# SPECIAL COMMITTEES OF SECTIONS.

## SCIENTIFIC PAPERS.

### COMMITTEE ON EPITOME OF UNOFFICINAL PREPARATIONS.

C. S. N. HALLBERG (Chairman) ..........................................Chicago, Ill.

H. M. WHELPLEY, St. Louis, Mo.
H. W. SNOW, Omaha, Neb.

# COUNCIL.

## MEMBERS OF THE COUNCIL.

| *Term Expires.* | | |
|---|---|---|
| 1893. | THE OFFICERS OF THE ASSOCIATION, *ex-officio:* | |
| " | PHILIP C. CANDIDUS | Mobile, Ala. |
| " | CHARLES F. GOODMAN | Omaha, Neb. |
| " | HENRY M. WHELPLEY | St. Louis, Mo. |
| 1894. | JAMES M. GOOD | St. Louis, Mo. |
| " | ADAM CONRATH | Milwaukee, Wis. |
| " | CHARLES T. P. FENNEL | Cincinnati, O. |
| 1895. | HENRY M. WHITNEY | Lawrence, Mass. |
| " | GUSTAVUS RAMSPERGER | New York, N. Y. |
| " | CHARLES E. DOHME | Baltimore, Md. |

## OFFICERS OF THE COUNCIL.

JAMES M. GOOD, Chairman. H. M. WHITNEY, Vice-Chairman.
GEORGE W. KENNEDY, Secretary.

## COMMITTEES OF THE COUNCIL.

*On Membership:* H. M. WHELPLEY, Chairman,
ANDREW P. PRESTON,
SIDNEY P. WATSON,
WILLIAM H. AVERILL,
HENRY BIROTH.
THE TREASURER AND PERMANENT SECRETARY OF THE ASSOCIATION, *ex-officio.*

*On Finance:* CHARLES E. DOHME, Chairman,
C. F. GOODMAN,
GUST. RAMSPERGER.

*On Publication:* C. T. P. FENNEL, Chairman,
ADAM CONRATH,
P. C. CANDIDUS,
HENRY KRAEMER,
JOHN M. MAISCH.

*On Centennial Fund:* JOSEPH P. REMINGTON, Chairman,
CHARLES E. DOHME,
JOHN M. MAISCH.

*Auditing Committee* (Appointed by the Chairman of the Council):
CHARLES E. DOHME, Chairman,
CHARLES CASPARI, Jr.,
D. M. R. CULBRETH,

*On Prizes:* S. A. D. SHEPPARD, Chairman,
(See pages 62 and 63.)
ADAM CONRATH,
CHAS. T. P. FENNEL.

# LIST OF OFFICERS OF THE ASSOCIATION SINCE ITS ORGANIZATION.

(DECEASED IN ITALICS.)

| Date. | Place of Meeting. | Presidents. | First Vice-Presidents. | Second Vice-Presidents. | Third Vice-Presidents. |
|---|---|---|---|---|---|
| Oct. 6, 1852.. | Philadelphia, Pa.... | *Daniel B. Smith*, Philadelphia. | *George W. Andrews*, Baltimore. | Samuel M. Colcord, Boston. | *C. Augustus Smith*, Cincinnati. |
| Aug. 24, 1853.. | Boston, Mass....... | *William A. Brewer*, Boston. | *George D. Coggeshall*, New York. | *Alexander Duval*, Richmond, Va. | Charles B. Guthrie, Memphis, Tenn. |
| July 25, 1854.. | Cincinnati, O. ....... | *William B. Chapman*, Cincinnati. | Henry T. Cummings, Portland, Me. | *John Meakim*, New York. | *Joseph Laidley*, Richmond, Va. |
| Sept. 11, 1855.. | New York, N. Y. ... | *John Meakim*, New York. | Charles B. Guthrie, Memphis, Tenn. | *Charles Ellis*, Philadelphia. | *Henry F. Fish*, Waterbury, Conn. |
| Sept. 9, 1856.. | Baltimore, Md. ..... | *George W. Andrews*, Baltimore. | *John L. Kidwell*, Washington, D. C. | Frederick Stearns, Detroit, Mich. | *Henry T. Kiersted*, New York. |
| Sept. 8, 1857.. | Philadelphia, Pa. ... | *Charles Ellis*, Philadelphia. | *James Cooke*, Fredericksburg, Va. | *Samuel P. Peck*, Bennington, Vt. | A. E. Richards, Plaquemine, La. |
| Sept. 14, 1858.. | Washington, D. C... | *John L. Kidwell*, Georgetown, D. C. | Edward R. Squibb, Brooklyn, N. Y. | *James O'Gallagher*, St. Louis. | Robert Battey, Rome, Ga. |
| Sept. 13, 1859.. | Boston, Mass. ....... | Samuel M. Colcord, Boston. | *William Procter, Jr.*, Philadelphia. | *Joseph Roberts*, Baltimore. | Edwin O. Gale, Chicago. |
| Sept. 11, 1860.. | New York, N. Y. ... | *Henry T. Kiersted*, New York. | William J. M. Gordon, Cincinnati. | William S. Thompson, Baltimore. | Theodore Metcalf, Boston. |
| Aug. 27, 1862.. | Philadelphia, Pa. ... | *William Procter, Jr.*, Philadelphia. | *John Milhau*, New York. | *Eugene L. Massot*, St. Louis. | *J. Faris Moore*, Baltimore. |
| Sept. 8, 1863.. | Baltimore, Md. ..... | *J. Faris Moore*, Baltimore. | John M. Maisch, Philadelphia. | Chas. A. Tufts, Dover, N. H. | *George W. Weyman*, Pittsburgh. |
| Sept. 21, 1864.. | Cincinnati, O. ...... | William J. M Gordon, Cincinnati. | *Richard H. Stabler*, Alexandria, Va. | Enno Sander, St. Louis. | *Thomas Hollis*, Boston. |

| | | | | | |
|---|---|---|---|---|---|
| Sept. 5, 1865.. | Boston, Mass....... | *Henry W. Lincoln*, Boston. | *George C. Close*, Brooklyn, N. Y. | *Elijah W. Sackrider*, Cleveland, O, | Charles A. Heinitsh, Lancaster, Pa. |
| Aug. 22, 1866.. | Detroit, Mich....... | Frederick Stearns, Detroit, Mich. | *Edward Parrish*, Philadelphia. | Ezekiel H. Sargent, Chicago. | *John W. Shedden*, New York. |
| Sept. 10, 1867.. | New York .......... | *John Milhau*, New York. | Robert J. Brown, Leavenworth, Kan. | N. Hynson Jennings, Baltimore. | *Daniel Henchman*, Boston. |
| Sept. 8, 1868.. | Philadelphia, Pa.... | *Edward Parrish*, Philadelphia. | *Ferris Bringhurst*, Wilmington, Del. | *Edward S. Wayne*, Cincinnati. | Albert E. Ebert, Chicago. |
| Sept. 7, 1869.. | Chicago, Ill......... | Ezekiel H. Sargent, Chicago. | Ferdinand W. Sennewald, St. Louis. | *John H. Pope*. New Orleans. | Joel S. Orne, Cambridgeport, Mass. |
| Sept. 13, 1870.. | Baltimore, Md...... | *Richard H. Stabler*, Alexandria, Va. | Fleming G. Grieve, Milledgeville, Ga. | James G. Steele, San Francisco. | *Eugene L. Massot*, St. Louis. |
| Sept. 12, 1871.. | St. Louis, Mo ...... | Enno Sander, St. Louis. | C. Lewis Diehl, Louisville, Ky. | George F. H. Markoe, Boston. | Matthew F. Ash, Jackson, Miss. |
| Sept. 3, 1872.. | Cleveland, O. ....... | Albert E. Ebert, Chicago. | *Samuel S. Garrigues*, East Saginaw, Mich. | Edward P. Nichols. Newark, N. J. | Henry C. Gaylord, Cleveland, O. |
| Sept. 16, 1873.. | Richmond, Va...... | John F. Hancock, Baltimore. | William Saunders, London, Ont. | John T. Buck, Jackson, Miss. | *Paul Balluff*, New York. |
| Sept. 8, 1874.. | Louisville, Ky...... | C. Lewis Diehl, Louisville, Ky. | *Joseph Roberts*, Baltimore. | William T. Wenzell, San Francisco. | Augustus R. Bayley, Cambridgeport, Mass. |
| Sept. 7, 1875.. | Boston, Mass. ....... | George F. H. Markoe, Boston. | Frederick Hoffmann, New York. | T. Roberts Baker, Richmond, Va. | Christian F. G. Meyer, St. Louis, |
| Sept. 12, 1876.. | Philadelphia, Pa.... | Charles Bullock, Philadelphia. | Samuel A. D. Sheppard. Boston. | *Gustavus J. Luhn*, Charleston, S. C. | *Jacob D. Wells*, Cincinnati. |
| Sept. 4, 1877.. | Toronto, Can....... | William Saunders, London, Ont. | Ewen McIntyre, New York. | John Ingalls, Macon, Ga. | *Emlen Painter*, San Francisco. |
| Nov. 26, 1878.. | Atlanta, Ga......... | *Gustavus J. Luhn*, Charleston, S. C. | Frederick T. Whiting, Great Barrington, Mass. | Henry J. Rose, Toronto, Can. | *William H. Crawford*, St. Louis. |
| Sept. 9, 1879.. | Indianapolis, Ind. .. | George W. Sloan, Indianapolis, Ind. | T. Roberts Baker, Richmond, Va. | Joseph L. Lemberger, Lebanon, Pa. | Philip C. Candidus, Mobile, Ala. |

# LIST OF OFFICERS. (Continued.)

| Date. | Place of Meeting. | Presidents. | First Vice-Presidents. | Second Vice-Presidents. | Third Vice-Presidents. |
|---|---|---|---|---|---|
| Sept. 14, 1880 | Saratoga, N. Y | James T. Shinn, Philadelphia. | George H. Schafer, Fort Madison, Ia. | William S. Thompson, Washington. | William Simpson, Raleigh, N. C. |
| Aug. 23, 1881 | Kansas City, Mo | *P. Wendover Bedford*, New York. | *Emlen Painter*, San Francisco. | George Leis, Lawrence, Kan. | *John F. Judge*, Cincinnati. |
| Sept. 12, 1882 | Niagara Falls, N. Y. | Charles A. Heinitsh, Lancaster, Pa. | John Ingalls, Macon, Ga. | Louis Dohme, Baltimore. | *William B. Blanding*, Providence, R. I. |
| Sept. 11, 1883 | Washington, D. C. | William S. Thompson, Washington, D. C. | Charles Rice, New York. | *Frederick H. Masi*, Norfolk, Va. | Edward W. Runyon, San Francisco. |
| Aug. 26, 1884 | Milwaukee, Wis | John Ingalls, Macon, Ga. | John A. Dadd, Milwaukee, Wis. | Henry Canning, Boston, Mass. | Charles F. Goodman, Omaha, Neb. |
| Sept. 8, 1885 | Pittsburgh, Pa | *Joseph Roberts*, Baltimore, Md. | Albert H. Hollister, Madison, Wis. | Albert B. Prescott. Ann Arbor, Mich. | Joseph S. Evans, West Chester, Pa. |
| Sept. 7, 1886 | Providence, R. I | Chas. A. Tufts, Dover, N. H. | *Henry J. Menninger*, Brooklyn, N. Y. | M. W. Alexander, St. Louis, Mo. | Norman A. Kuhn, Omaha, Neb. |
| Sept. 5, 1887 | Cincinnati, O | John U. Lloyd, Cincinnati, O. | M. W. Alexander, St. Louis, Mo. | A. K. Finlay, New Orleans, La. | Karl Simmon, St. Paul, Minn. |
| Sept. 3, 1888 | Detroit, Mich | M. W. Alexander, St. Louis, Mo. | Jas. Vernor, Detroit, Mich. | Fred. Wilcox, Waterbury, Conn. | Alvin A. Yeager, Knoxville, Tenn. |
| June 24, 1889 | San Francisco, Cal | *Emlen Painter*, New York. | Karl Simmon, St. Paul, Minn. | Wm. M. Searby, San Francisco. | Jos. W. Eckford. Aberdeen, Miss. |
| Sept. 8, 1890 | Old Pt. Comfort, Va. | A. B. Taylor, Philadelphia. | A. B. Stevens, Ann Arbor, Mich. | Chas. E. Dohme, Baltimore, Md. | Jas. M. Good, St. Louis, Mo. |
| April 27, 1891 | New Orleans, La | A. K. Finlay, New Orleans, La. | Geo. J. Seabury, New York, N. Y. | W. H. Torbert, Dubuque, Ia. | L. T. Dunning, Sioux Falls, S. Dak. |
| July 14, 1892 | Profile House, N. H. | Jos. P. Remington, Philadelphia. | A. P. Preston, Portsmouth, N. H. | Sidney P. Watson, Atlanta, Ga. | Wm. H. Averill, Frankfort, Ky. |
| Aug. 14, 1893 | Chicago, Ill | | | | |

## TREASURERS.

Alfred B. Taylor, Philadelphia, 1852–54.
Samuel M. Colcord, Boston, 1854–56, and 1857–59.
*James S. Aspinwall*, New York, 1856–57.
*Ashel Boyden*, Boston, 1859–60.
Henry Haviland, New York, 1860–63.
J. Brown Baxley, Baltimore, 1863–65.
Charles A. Tufts, Dover, N. H., 1865–86.
Samuel A. D. Sheppard, Boston, 1886–93.

## RECORDING SECRETARIES.

*George D. Coggeshall*, New York, 1852–53.
*Edward Parrish*, Philadelphia, 1853–54.
*Edward S. Wayne*, Cincinnati, 1854–55.
William J. M. Gordon, Cincinnati, 1855–59.
Charles Bullock, Philadelphia, 1859–60.
James T. Shinn, Philadelphia, 1860–62.
*Peter W. Bedford*, New York, 1862–63.
William Evans, Jr., Philadelphia, 1863–64.
Henry N. Rittenhouse, Philadelphia, 1864–65
John M. Maisch, Philadelphia, 1865–93.

## CORRESPONDING SECRETARIES.

*William Procter, Jr.*, 1852–53, and 1854–57.
*William B. Chapman*, Cincinnati, 1853–54.
*Edward Parrish*, Philadelphia, 1857–58.
*Ambrose Smith*, Philadelphia, 1858–59.
*William Hegeman*, New York, 1859–60.
*Peter W. Bedford*, New York, 1860–62, and 1863–66.
John M. Maisch, Philadelphia, 1862–63.

## LOCAL SECRETARIES.

For the meeting held in
1867....*P. Wendover Bedford.*
1868....Alfred B. Taylor.
1869....*Henry W. Fuller.*
1870....*J. Faris Moore.*
1871....*William H. Crawford.*
1872....Henry C. Gaylord.
1873....Thomas H. Hazard.
1874....Emil Scheffer.
1875....Samuel A. D. Sheppard.

For the meeting held in
1876....Adolphus W. Miller.
1877....Henry J. Rose.
1878....*Jesse W. Rankin.*
1879....Eli Lilly.
1880....Charles F. Fish.
1881....William T. Ford.
1882....*Hiram E. Griffith.*
1883....Charles Becker.
1884....Henry C. Schranck.

For the meeting held in
1885....George A. Kelly.
1886....*William B. Blanding.*
1887....George W. Voss.
1888....James Vernor.
1889....Edward W. Runyon.
1890....Charles E. Dohme.
1891....A. K. Finlay.
1892....H. M. Whitney.
1893....Henry Biroth.

## REPORTERS ON PROGRESS OF PHARMACY.

C. L. Diehl, Louisville, Ky., 1873–91.
Chas. Rice, New York, N. Y., 1891–92.
Henry Kraemer, New York, N. Y., 1892–93.

# AUTHORIZED AGENTS OF THE AMERICAN PHARMACEUTICAL ASSOCIATION.

Appointed by the President in compliance with the following resolutions:

*Resolved*, That the President be directed to appoint authorized agents, where needed in the different States, for the collection of dues, distribution of the Proceedings, etc.: such agents to be designated by the Treasurer and Permanent Secretary of the Association, and a list of the agents to be published in the Proceedings. (Passed at Baltimore, 1870.)

*Resolved*, That the President of this Association be requested to appoint, in every locality where more than three members reside, a local agent, whose duty it shall be to aid the Treasurer in the collection of members' dues in his section, and to procure new members by placing before the pharmacists, and others eligible to membership, the great advantages that they will derive from associating themselves with this body. (Passed at Indianapolis, 1879.)

*Resolved*, That whilst it is desirable that the authorized agents shall at all times render their accounts as promptly as convenient, it is especially to be desired that they render a complete account to the Treasurer of such moneys as are in their hands on the first day of August and December in each year, in order that the Treasurer may be able to make his yearly accounts as full as possible. (Passed by Council, 1883.)

| | | |
|---|---|---|
| *Alabama,* | P. C. Candidus, | Mobile. |
| *Arkansas,* | John B. Bond, Main and Fifth streets, | Little Rock. |
| | William L. Dewoody, | Pine Bluff. |
| *California,* | William T. Wenzell, 322 Polk street, | San Francisco. |
| | George B. Flint, 1101 Broadway, | Oakland. |
| *Colorado,* | Edmund L. Scholtz, Sixteenth & Stout streets, | Denver. |
| *Dist. of Columbia,* | John A. Milburn, 1817 Sixteenth st., N. W., | Washington, |
| *Connecticut,* | John K. Williams, 391 Main street, | Hartford. |
| | Warren A. Spalding, 19 Church street, | New Haven. |
| | Luzerne I. Munson, Apothecaries' Hall, | Waterbury. |
| *Delaware,* | Linton Smith, Church and Bennett streets, | Wilmington, |
| *Florida,* | William Aird, Maggie & E. Brough streets, | Jacksonville. |
| *Georgia,* | Theo. Schumann, Whitehall & Hunter streets, | Atlanta. |
| | Robert H. Land, 812 Broad street, | Augusta. |
| | John Ingalls, Fourth and Poplar streets, | Macon. |
| *Illinois,* | David G. Plummer, 6 Main street, | Bradford. |
| | C. S. N. Hallberg, 358 Dearborn streets, | Chicago. |
| | Charles Zimmermann, 423 S. Adams street, | Peoria. |
| *Indiana,* | Henry J. Schlaepfer, Second and Main streets, | Evansville. |
| | George W. Sloan, 22 W. Washington street, | Indianapolis, |
| | Jacob Baur, 701 Wabash avenue, | Terre Haute. |
| *Iowa,* | John W. Ballard, 106 West Second street, | Davenport. |
| | Theodore W. Ruete, 568 Main street, | Dubuque. |
| | George H. Schafer, 713 Front street, | Fort Madison. |
| | Silas H. Moore, 80 Fourth street, | Sioux City. |

| | | |
|---|---|---|
| *Kansas,* | George Leis, 747 Massachusetts street, | Lawrence. |
| | Robert J. Brown, 113 Delaware street, | Leavenworth. |
| *Kentucky,* | George A. Zwick, Eleventh st. and Madison ave., | Covington. |
| | William H. Averill, 435 Main street, | Frankfort. |
| | C. Lewis Diehl, Third street and Broadway, | Louisville. |
| *Louisiana,* | Alexander K. Finlay, 186 Camp street, | New Orleans. |
| *Maine,* | Noah S. Harlow, 4 Smith's Block, | Bangor. |
| | Henry H. Hay, Free and Middle sts., | Portland. |
| *Maryland,* | D. M. R. Culbreth, Charles and Eager streets, | Baltimore. |
| | Thomas W. Shryer, 111 Baltimore street, | Cumberland. |
| *Massachusetts,* | S. A. D. Sheppard, 1129 Washington street, | Boston. |
| | Joel S. Orne, 493 Main street, | Cambridgeport. |
| | B. Frank Stacey, Thompson Square, | Charlestown. |
| | Frederick T. Whiting, Main street, | Great Barrington. |
| | Freeman H. Butler, 141 Central street, | Lowell. |
| | James E. Blake, 64 North Second street, | New Bedford. |
| | John H. Manning, 51 North street, | Pittsfield. |
| | Joseph J. Estes, Union and Church streets, | Rockland. |
| | Thomas B. Nichols, 178 Essex street, | Salem. |
| | William Bush, 56 Front street, | Worcester. |
| *Michigan,* | Ottmar Eberbach, 12 South Main street, | Ann Arbor. |
| | James Vernor, 235 Woodward avenue, | Detroit. |
| | Jacob Jesson, Western avenue and Jefferson street, | Muskegon. |
| *Minnesota,* | E. Floyd Allen, 1020 Hennepin avenue, | Minneapolis. |
| | Karl Simmon, Seventh and Sibley streets, | St. Paul. |
| *Mississippi,* | Joseph W. Eckford, Commerce street, | Aberdeen. |
| | Matthew F. Ash, P. O. Box 129, | Jackson. |
| *Missouri,* | William T. Ford, 1305 Cherry street, | Kansas City. |
| | James M. Good, 2348 Olive street, | St. Louis. |
| *Nebraska,* | Charles F. Goodman, 1110 Farnham street, | Omaha. |
| *Nevada,* | William A Perkins, 84 South C street, | Virginia City. |
| *New Hampshire,* | Francis C. Miville, 1023 Elm street, | Manchester. |
| | Nelson S. Whitman, 175 Main street, | Nashua. |
| *New Jersey,* | Wm. M. Oliver, 132 Broad street, | Elizabeth. |
| | Hermann Klussmann, Fourth st. and Lafayette av., | Hoboken. |
| | Maxwell Abernethy, 188 Newark avenue, | Jersey City. |
| | Charles B. Smith, 861 Broad street, | Newark. |
| | Howard P. Reynolds, Park and North avenues, | Plainfield. |
| *New York,* | Charles H. Gaus, 202 Washington avenue, | Albany. |
| | Charles O. Rano, 1872 Niagara street, | Buffalo. |
| | William L. Du Bois, 281 Main street, | Catskill. |
| | John Hepburn, 103 Main street, | Flushing. |
| | Harvey G. Goodale, P. O. Box 29, | Jamaica. |
| | James T. King, Main and South streets, | Middletown. |
| | John McKesson, Jr., 91 Fulton street, | New York. |
| | G. H. Haass, 105 East Main street, | Rochester. |
| | John G. Bissell, 45 Dominick street, | Rome. |
| | Charles F. Fish, 348 Broadway, | Saratoga. |
| | Charles W. Snow, 214 Warren street, | Syracuse. |
| | William Blaikie, 202 Genesee street, | Utica. |
| *North Carolina,* | William Simpson, 101 Fayetteville street, | Raleigh. |
| | John H. Hardin, 124 South Front street, | Wilmington. |

| | | |
|---|---|---|
| *Ohio,* | Walter H. Howson, Water and Walnut streets, | Chillicothe. |
| | J. U. Lloyd, Court and Plum streets, | Cincinnati. |
| | George L. Hechler, 1099 Broadway, | Cleveland. |
| | Charles Huston, 47 South High street, | Columbus. |
| | Henry F. Kurfurst, 502 Xenia avenue, | Dayton. |
| | Thomas J. Casper, 41 East Main street, | Springfield. |
| | Charles Hohly, 602 S. St. Clair street, | Toledo. |
| *Oregon,* | Louis Blumauer, Fourth and Morrison streets, | Portland. |
| *Pennsylvania,* | Jacob A. Miller, Second and Chestnut streets, | Harrisburg. |
| | Charles A. Heinitsh, 16 East King street, | Lancaster. |
| | Joseph L. Lemberger, 5 North Ninth street, | Lebanon. |
| | Richard M. Shoemaker, Fourth and Race streets, | Philadelphia. |
| | George A. Kelly, 101 Wood street, | Pittsburgh. |
| | Philip M. Ziegler, 526 Penn street, | Reading. |
| | John M. McNeil, Broadway, | Scottdale. |
| | Edward A. Cornell, Fourth and Pine streets, | Williamsport. |
| *Rhode Island,* | Wm. H. Cotton, 226 Thames street, | Newport. |
| | Wm. K. Reynolds, 354 Friendship street, | Providence. |
| *South Carolina,* | Edward S. Burnham, 369 King street, | Charleston. |
| *Tennessee,* | Jas. S. Robinson, Second and Madison streets, | Memphis. |
| | John C. Wharton, Vine and Church streets, | Nashville. |
| *Texas,* | L. Myers Connor, 1101 Elm street, | Dallas. |
| | Thomas W. Powell, 10 Houston street, | Fort Worth. |
| | Geo. J. F. Schmitt, 507 W. Commerce street, | San Antonio. |
| *Utah,* | Frank A. Druehl, Main and 3d South streets, | Salt Lake City. |
| *Vermont,* | Geo. A. Crossman, 2 Simonds Block, | Brandon. |
| *Virginia,* | Edward C. Jackson, 523 Church street, | Norfolk. |
| | T. Roberts Baker, 919 East Main street, | Richmond. |
| *Washington,* | Henry E. Holmes, | Seattle. |
| *West Virginia,* | Edwin L. Boggs, Kanawha Bank Building, | Charleston. |
| | Edmund Bocking, 1 Odd Fellows' Hall, | Wheeling. |
| *Wisconsin,* | Albert H. Hollister, 3 N. Pinckney street, | Madison. |
| | John R. Drake, 365 East Water street, | Milwaukee. |
| *Prov. Nova Scotia,* | Francis C. Simson, | Halifax. |
| *Prov. Ontario,* | John Lowden, 53 Colborne street, | Toronto. |
| *Prov. Quebec,* | Henry R. Gray, 122 St. Lawrence Main street, | Montreal. |

# THE PERMANENT FUNDS OF THE AMERICAN PHARMACEUTICAL ASSOCIATION.

At the San Francisco meeting in 1889, the Permanent Secretary was directed to publish annually, in the Proceedings, a brief history of the origin, money value, and use to which each Fund may be applied.

There are three permanent Funds at the present time, all of which are invested in government bonds, in the name of the Treasurer of the American Pharmaceutical Association, and kept in the custody of the Chairman of the Council.

## THE LIFE MEMBERSHIP FUND.

The Constitution, as originally adopted in 1852, and up to the year 1856, contained no provision for life membership or for the creation of a permanent fund. In the year named, a revised Constitution was reported by a committee, and, after consideration, adopted (see Proceedings 1856, pp. 12, 14, 27 and 79). Article II., Section 7 (afterwards Section 8), contained the following provision:

"Members who have paid their annual contribution for ten successive years shall be considered life members, and exempt from their yearly payments, and entitled to a certificate to that effect."

Owing to increased expenditures for the publication of the Proceedings, etc., the Association found it necessary in 1867 (Proceedings, p. 75) to increase its revenue, one of the measures being the erasing of Section 8, and the total abandonment of life membership in the future.

In 1870 a revised Constitution was adopted (see Proceedings 1870, pp. 87–96), and is in force at the present time, containing the following:

"Article IV. All moneys received from life membership, together with such funds as may be bequeathed, or otherwise donated to the Association, shall be invested by the Treasurer in United States Government or State securities, *the annual interest of which only shall be used by the Association for its current expenses.*"

Chapter VI., Article 5, of the By-Laws adopted the same year, reads as follows:

"Any member who shall pay to the Treasurer the sum of *seventy-five dollars at a time* shall become a life member, and shall be exempt from all future annual contributions."

In the roll of members for the year 1872 (page 338) the name of the late Charles W. Badger, of Newark, N. J., appears for the first time as a life member, and the only one (until the time of his death in 1877) under this provision, which was subsequently modified (Proceedings 1879, page 799) so as to reduce the sum to be paid into the treasury by those who had been members for from five to twenty years. In the same year the published roll contained the names of two new life members. The article on life membership was further modified in 1888 (Proceedings, page 52) so as to apply also to those who have been members for over twenty years (see Chapter VIII., Article 4 of By-Laws). Under this clause the life membership (new style) of the present roll is thirty-seven, as published in the Proceedings, pages 387 and 1106.

The Treasurer's report for 1880 (page 524) states the life membership fund to be $75, for 1881 (p. 513) $613, for 1882 (p. 608) $685, for 1883 (p. 436) $904.38, and for 1884

(p. 524) $944.14. At the Milwaukee meeting, held in the same year, the Association directed (Proceedings, p. 525) that $316, which amount had been in past years donated to the funds of the Association by various members, be withdrawn from the general fund and be added to the Life Membership Fund. At the Providence meeting in 1886 (Proceedings, p. 147), it was recommended by the Finance Committee, and approved by the Council and by the Association, that the sum of $3,000 be transferred from the general fund to the Life Membership Fund. At the Cincinnati meeting in 1887 (Proceedings, p. 471), the Association ordered again a transfer to the same fund of $4,000.

Since 1887 the annual reports of the Chairman of the Council give the number of each bond of the Government securities in which the Life Membership Fund is invested. The report published on page 27 of the present volume shows that on June 4, 1892, the value of the Life Membership Fund was $10,208.97, of which sum *the annual interest only shall be used by the Association for its current expenses.*

## THE EBERT FUND.

At the Richmond meeting in 1873 (Proceedings, p. 58), Mr. Albert E. Ebert presented to the Association the sum of five hundred dollars, to be used in the following manner:

"The money to be properly invested by order of the Executive Committee, and the annual interest derived therefrom to be appropriated *for conferring a suitable prize* for the best essay or written contribution containing AN ORIGINAL INVESTIGATION OF A MEDICINAL SUBSTANCE, determining new properties, or containing other meritorious contributions to knowledge; or for IMPROVED METHODS of determined merit, for the preparation of chemical or pharmacal products: the prize to be awarded by a suitable committee within six months after the annual meeting at which the essays are presented for competition; *provided*, that in case no one of the essays offered is of sufficient merit to justify the award, in the judgment of the Committee on Prize Essays, all may be rejected, and the sum added to that of the Fund."

The offer was accepted by the Association, and by a special vote (*Ibid.*, page 70,) the fund was ordered to be called the *Ebert Fund*, and the prize awarded from the proceeds to be known as the *Ebert Prize.*

The Ebert Prize was awarded for the year 1874 to Chas. L. Mitchell; for 1877, to Fred. B. Power; for 1882, to John U. Lloyd; for 1886, to Emlen Painter; for 1887, to Edward Kremers; for 1888, to Jos. F. Geisler; for 1890, to Wm. T. Wenzell; and for 1891, to John U. Lloyd.

The Ebert Fund amounted in 1883 (Proceedings, p. 436) to $683.43. Since 1887 the reports of the Chairman of the Council specify the securities in which this fund is invested. On June 4, 1892 (Proceedings, p. 26) its reported value was $761.55. The *annual interest must be applied to a prize for an original investigation* meeting the requirements stated above.

## THE CENTENNIAL FUND.

After the meeting held in Philadelphia in 1876, the local committees, on settling all accounts for the entertainment of the Association, had an unexpended balance left, which by subsequent collections made in Philadelphia was increased to $525. At the Toronto meeting in 1877 (Proceedings, p. 481), Dr. A. W. Miller, local secretary for 1876, presented this sum in the name of the local committees, to the Association, with this condition, "that a like amount be subscribed by the members within one year," with a view of establishing a fund *to aid in the prosecution of original investigations*, the interest accruing from the investment of the fund to be devoted to the defraying of expenses actually incurred by members in conducting investigations in some branch of science

connected with pharmacy. The Association accepted the conditions (*Ibid.*, pp. 526, 528), and adopted the name *Centennial Fund.*

The collection of a like amount by the Association was completed at the Saratoga meeting (Proceedings 1880, p. 553), when $582.81 had thus been received. In the following year a committee of the Centennial Fund was provided for in the By-Laws of the Council, Chapter VII. (Proceedings 1881, pp. 190, 549). Members have not availed themselves of this Fund to the extent contemplated at its foundation; for the amounts paid out have been only $7.50 to Rob. B. Warder for material used for investigations reported in 1885; $96.80 used by the Committee on National Formulary during the years 1886 and 1887 (Proceedings 1889, page 16); and $32 to Edward Kremers for material necessary for the prosecution of scientific research on the menthol group, reported in the present volume.

The original sum of $1117.81 ($525 + 582.81) had increased in 1883 to $1232.76. Since 1887 the securities in which the Fund is invested are specified in the reports of the Chairman of the Council; the reported value was $1470.49 on June 4, 1892 (see Proceedings, p. 27). *The interest accruing from this Fund is to be used for defraying the expenses incurred in conducting original investigations in pharmacy or an allied science.*

## THE GENERAL FUND.

In October, 1891 (see Proceedings 1892, page 13), the Council instructed the Treasurer to draw from the cash on deposit a sufficient sum and purchase therewith three bonds, one thousand dollars each, the same to be such bonds as shall be approved by the Finance Committee, said bonds to be registered in the name of the Treasurer of the American Pharmaceutical Association, and placed in the custody of the Chairman of the Council.

The investment was made in bonds of the American Security and Trust Company at Washington, D. C., for the sum of $3021.62 (see Proceedings 1892, pages 27 and 28).

# CONTENTS.

# PREFATORY NOTICE.

The distribution of the printed Minutes, with the papers read at the meeting, in advance of the Proceedings, which was inaugurated in 1891, was continued after the last meeting, in accordance with the recommendation of the Publication Committee (see p. 25 of present volume). Two pamphlets were thus sent out to the members, covering 395 printed pages of the present volume. Members who have paid their annual dues for 1892, are entitled to this volume, which will be sent to the address printed in the alphabetical list on pages 1164, etc., unless otherwise informed. A list of queries suitable for investigation has not been printed by the Committee.

The Treasurer has reported the following new members in addition to the list published on pages 1111–1113 of the present volume:

Capper, Wm. E., Boston. Tilden, A. K., Boston.

With the object of securing for the Proceedings as wide a distribution as possible, the Committee on Publication offer the different issues at the following reduced rates:

| | | PAPER COVER. | BOUND CLOTH. |
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| 1851, 1852, 1853, 1854, 1855 | each | $ .25 | $ |
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1856 is out of print; none published in 1861.

**Beginning with the first issue, in 1851, the actual cost of partial or complete sets—bound in cloth as far as on hand—will be as follows:**

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| 1862 | 10 | 5 75 | 4 02 | 1874 | 22 | 23 75 | 13 25 | 1886 | 34 | 62 75 | 25 10 |
| 1863 | 11 | 6 75 | 4 72 | 1875 | 23 | 26 75 | 13 38 | 1887 | 35 | 66 75 | 26 70 |
| 1864 | 12 | 7 75 | 5 42 | 1876 | 24 | 29 75 | 14 88 | 1888 | 36 | 72 25 | 28 90 |
| 1865 | 13 | 8 75 | 6 12 | 1877 | 25 | 32 75 | 16 38 | 1889 | 37 | 77 75 | 31 10 |
| 1866 | 14 | 10 25 | 7 18 | 1878 | 26 | 35 75 | 17 88 | 1890 | 38 | 83 25 | 33 30 |
| 1867 | 15 | 11 75 | 7 75 | 1879 | 27 | 38 75 | 19 38 | 1891 | 39 | 88 75 | 35 50 |
| 1868 | 16 | 13 25 | 7 95 | 1880 | 28 | 41 75 | 20 88 | 1892 | 40 | 94 25 | 37 70 |

**Orders for Proceedings should be sent to the Permanent Secretary, North Tenth, below Race street, Philadelphia, Pa.**

The gold badge, recently designed, may be procured from the Permanent Secretary on receipt of $2.


Blank forms of applications and recommendations for membership may be obtained from the Permanent Secretary or from the Committee on Membership; when properly filled up they should be sent to the Secretary of the Committee on Membership, Geo. W. Kennedy, Pottsville, Pa., at least one week before the meeting; if sent later, they should be addressed to him in the care of the Local Secretary, Henry Biroth, Rooms 1111–1113 Schiller Building, 103–109 Randolph Street, Chicago, Ill.

The forty-first annual meeting of the Association will convene in the City of Chicago, on the second Monday (14th day) of August, 1893, at 3 o'clock p. m.; and the International Pharmaceutical Congress will meet in the same city, beginning Monday, August 21st, 1893.

# MINUTES

OF THE

# FORTIETH ANNUAL MEETING.

FIRST SESSION—THURSDAY MORNING, JULY 14, 1892.

In conformity with a resolution passed by the Council in November, 1891, the American Pharmaceutical Association met at its fortieth annual meeting in the concert and ball room of the Profile House, White Mountains, N. H., on the morning of Thursday, July 14. President Finlay called the meeting to order at 10:10 a. m., and introduced Mr. A. P. Preston, of Portsmouth, N. H., who addressed the Association as follows:

*Mr. President, Ladies and Gentlemen:*

In behalf of the pharmacists of New Hampshire, it gives me great pleasure to welcome you to the State of which, I know you will say with me, we ought to be justly proud. In this peaceful valley, surrounded by these grand and beautiful mountains, your meeting should be one of unqualified success. All of the better thoughts, all of the better feelings of manhood should here come to the front. We should be, as it were, in direct communication with nature, and thus utter our best thoughts, our best sentiments, and our best feelings. The State of New Hampshire is a peculiar State. It is very doubtful, sir, if any State in this union of States can offer as many attractions, so varied in their nature, to the summer traveler. We have grand and beautiful mountains, we have wonderfully beautiful placid sheets of water, and we have a glorious bit of ocean frontage away down in the distance. After a long time, your Association—this grand National Association of pharmacists—has come to our shores. We are very glad to welcome you. We are more than glad to have you here with us, and if, sir, your meeting is not one of profit, if the words here uttered, and the counsels here offered, are not such as should be fitted to such magnificent surroundings, then indeed your labors will be in vain.

When you leave this beautiful place, when you have taken your last look at the Profile Lake and at the Echo Lake, when you have given your last glance to the Grand Old Man of the Mountain out there, who watches and has charge of this wonderful valley, you will not even then have seen all New Hampshire has to offer. Your Local Secretary, sir, has arranged for you to see still other glorious sights. You are to ascend to the top of Mount Washington, the highest of the Presidential Range, the highest peak in our State; you are to ascend to the top of Mount Willard, and looking down that fearful precipice, have before you the glorious panorama of the Crawford Notch. You are to partake also, I am informed, of the hospitality of the State of Vermont at the Crawford House; then to proceed to Portland, I am told, there to receive a little Yankee hospitality from the pharmacists of Maine.

We wish you, sir—we wish you *all*—God-speed and much of profit in this, your fortieth meeting.

And now, I want to have one word more, especially for the ladies' sake. Some of us have been told that women possess a wonderful power; some of us have even been told that women possess the power to make us abandon our very country and relatives, and forsake all other friends to live and dwell with them. And, just at this time, *we* are under special obligations to the ladies; for we know, even away up here in the wilderness, as you may term it, in New Hampshire, we know perfectly well that to the lady members of our Association (if so we may term them) we are indebted for this visit. We thank you sincerely, ladies; you have shown excellent judgment, and your husbands excellent taste in following your suggestion.

I have nothing more to add, sir. I simply wish to repeat that we earnestly hope that your meeting may be one of profit and of great pleasure to you all.

MR. WHITNEY: *Mr. President, Ladies and Gentlemen:* This meeting was called to order while I was absent, being engaged with a gentleman representing the transportation company, and therefore could not be present. I regret this, for I had requested President Finlay to allow me the privilege of introducing Mr. Preston, who has addressed you on behalf of the New Hampshire committee. I trust you will allow me now to say a word. As Local Secretary, I need not say what a pleasure it has been for me to meet so many of you, nor need I refer to the greeting you have received in Boston as evidence of the kindly feeling towards this Association there. You may hear again from the good old "Bay State" later on. We are now in New Hampshire, and it is a great pleasure to refer to the last speaker as one who is not only proud of his native State, but honors the State, the county, and the town in which he lives, Mr. A. P. Preston, of Portsmouth, N. H.

The President called upon Mr. W. H. Torbert, of Dubuque, Iowa, to respond to the greeting from the New Hampshire pharmacists.

MR. TORBERT: Mr. Preston, Mr. Wetherell and Mr. Underhill, representing as you do, in this instance, the hospitality of New Hampshire, I am directed by the members of the American Pharmaceutical Association, their families and friends, to express to you their profound appreciation of your regal hospitality and your distinguished courtesies.

We had barely entered New England when our ovation began. In Boston they had set the mark for hospitality so high that it would seem difficult for New Hampshire alone to follow. We were there the recipients of many kindnesses: receptions, rides by rail and by sea, visits to points of historic interest, were the rule. Coming into the borders of your State, we were met by your committee, bearing us the hospitality of New Hampshire. We enjoyed, more than I am able to express, our ride on your beautiful lake, the very delightful collation which you had prepared, and your inspiring music, and as pharmacists we were not unmindful of those light and delicate aqueous preparations which it is always the province of the pharmacist to dispense. Boston and New Hampshire have placed us under a debt of obligation that we never expect to pay. We are quite willing now and here to go into general bankruptcy, and make Boston and New Hampshire the preferred creditors.

Mr. Chairman and Gentlemen of the Committee: If it shall ever happen to you or to any member of the New Hampshire fraternity to come to our homes, we will try to open as wide for you our hearts and our hospitality as you have done yours for us. We will give you anything we have—only ask for it. We have brought with us a sample of the choicest girls in America, and we have left lots of them at home. We have frequently refused to give them to worthy men, but I assure you, sirs, if a promising New Hamp-

shire man were to ask any of us for these daughters, he would have a mother-in-law in a minute.

Mr. Chairman, no language that I can express can adequately assert the gratitude that we feel to you gentlemen. We expect unto the latest day of our lives to rehearse to our children, and to our children's children, the delightful hours we have spent and shall spend here in New Hampshire, and the courtesies which you have extended to us. But, Mr. Chairman and Gentlemen of the Committee, two other reflections also come to me, and if you will pardon me a moment I will state them.

The first one is this—the community of interests between pharmacists everywhere and the American Pharmaceutical Association. It happens in New Hampshire, as it happens in many States throughout this Union, that we have not as many members in this Association as we ought to have; but it transpires that those we do have we are proud of. They are men of character, they are the men who have made the American Pharmaceutical Association one of the most potent factors in pharmacy in the world, and it is they who are the golden bond that unites the American Pharmaceutical Association with pharmacists everywhere. I sincerely hope that you gentlemen, coming into the inspiration of these conferences, will go back to your brothers and colleagues in pharmacy in New Hampshire, and that your co-operation with us may result in our roll-call from New Hampshire being greatly increased and multiplied by the time we come to hold our next annual meeting at the Columbian Exposition in Chicago.

The other reflection, Mr. Chairman, which comes to me is this: Standing here, in the land of the pilgrims, we recognize how we, all of us, are indebted for all the permanent good there is in this country to those who laid so broad and deep its foundation of honor, of honesty, of integrity, of purity. They laid deep the foundations of the school, they exalted the home, and from these two have come forth the men who have always been willing to uphold the dear old flag. From these have come the men and the women who have made America "the land of the free and the home of the brave." Let us, following their illustrious example, exalt the school, exalt the home, widen its pleasures, purify its joys, sanctify its sacredness, and then shall the dear old Republic be a shining example to all nations we precede. Then shall the dear old Republic lead in every reform, in every philanthropy, in every blessed civilization; and finally, Mr. President, the dear old Republic shall lead and guide the peoples of this world into that millennium of governmental peace and joy when every man shall look upon his neighbor as his brother, and the impulse of every man towards every other shall be the golden rule. (Applause.)

Vice-President Seabury took the chair, and President Finlay delivered the annual address as follows:

*Fellow-Members of the American Pharmaceutical Association:*

It was a happy thought that led to the selection of this lovely spot for the meeting of 1892. Surely a debt of gratitude is due to those who named the place. Our last meeting was held nearly fifteen months ago in a sub-tropical clime, down by the Southern boundary of this great country. What a contrast do we find in this region! The everlasting hills in solemn grandeur surround us; the air is bracing, the climate salubrious, and all nature conspires to render our visit enjoyable and beneficent.

This year, the fortieth of our existence as an Association, presents a double coincidence. It marks the fourth centennial of the discovery of this continent, and this very day notes the hundredth anniversary of the birth of the first President of the American Pharmaceutical Association, Daniel B. Smith, which happened on the 14th day of July, 1792.

When we consider the distance that separates the meeting places of this and the preceding year, and see so many of the familiar faces to-day that greeted us a year ago, we

are drawn to the conclusion that the occasion is one of no ordinary nature. It bespeaks a profound interest, an earnest purpose, and a potent magnetism which prompts our members to meet and labor in the cause of our loved profession; to exchange fraternal greetings and strengthen the friendships so pleasantly formed, which are destined to endure through life. That this may prove no exception to the rule, but that our deliberations may be crowned with successful results, and that nought may happen to cast a shadow on the enjoyment of the coming week, is my heart's sincerest wish.

In accordance with the custom which has governed my predecessors, I will present a synopsis of the leading events relating to our profession that have occurred since our last meeting.

Shortly after the meeting of 1891, the Pharmaceutical Society of Great Britain held its fiftieth annual meeting. It was eminently fit and proper that our body should tender its congratulations to its sister Society in the British Isles. Accordingly a communication was sent to the Pharmaceutical Society of Great Britain, which, together with the reply received, was printed in the Proceedings for 1891, pages 47 and 48.

On the twenty-second of October, 1891, the annual meeting of the National Wholesale Druggists' Association was held at Louisville, Ky. They were joined by the Association of Proprietors and Manufacturers. In accordance with the custom established, a delegation from this Association was appointed to visit that convention. The delegation, consisting of five representative members, was accorded the privilege of the floor, and right well did they perform their duty. The plan adopted by the American Pharmaceutical Association at the New Orleans meeting was freely discussed, and seemed to secure the general approval of the members present, and the commercial aspect of our affairs assumed a brighter hue. It does not appear, however, that the promises there made were fulfilled. Some of the proprietors, taking alarm from threatened legal complications, have failed to adhere to the contract, and the result is that certain persons are selling proprietary goods at greatly reduced rates in localities where the wholesale druggists had done their duty to the retail trade, by refusing to those cutters the benefit of the market.

While the evil may not be completely eradicated, it can be modified by local organized effort. I take pleasure in citing an instance in illustration.

Price-cutting in a mild form had become pretty general in my own city, and threatened to assume serious proportions. Shortly after the Louisville meeting the local organization was convened, and a committee appointed to canvass the trade. All, with two exceptions, signed for full prices, and the three wholesale houses signed an agreement not to sell to any cutter at less than the full retail price any article in the line of patent and proprietary medicines. The result, so far, has been satisfactory, and full values are restored.

On the 7th of June of the present year, the American Medical Association met at Detroit. A committee of twenty-five members from the American Pharmaceutical Association was appointed to visit that body. The chairman of that committee will present his report, which will without doubt prove interesting. The membership of the American Medical Association is restricted to the medical profession, and it would only seem reasonable that our delegates would appear in better form were they also members of the American Medical Association. They would then be entitled to vote and have the right of the floor during debate.

There is a great deal to be done in this connection. We have observed in the last few years the alarming inroads that have been made into our legitimate business by a number of enterprising persons who have to a large extent succeeded in prevailing on the members of the medical profession to prescribe their proprietary remedies in the form of ready-made prescriptions, which it is true are cleverly compounded and often present a handsome appearance, moreover they are frequently provided with appropriate and euphonious names, which are copyrighted.

While their exact composition is not known to the physician, it is certain that no single one contains any ingredient that does not form a part of our stock in trade. Yet the medical profession prescribe them, and they form a large proportion of the prescriptions on our files, until we stand appalled at the prospect of having our prescription departments eventually converted into patent medicine counters.

A stirring appeal to our friends of the medical profession should have its effect. It might check the tendency to fall into indolent methods of prescribing—that too frequently familiarizes their patients with certain remedies, which, when given under proper restrictions, would give good results, but whose frequent use must lead to the acquirement of baneful and pernicious habits. It has been alleged that medical men in some large cities carry around and dispense medicine, claiming justification on the ground that pharmacists are making inroads on their territory by counter prescribing. It is unfortunate that such should be the case, but perhaps the statement is an exaggeration. It is next to impossible for the pharmacist at times to escape assuming, to some extent, the physician's role, no matter how strenuously he may be opposed to it, especially in emergency cases and in minor surgery, when the sufferer applies in person for relief, and a physician is not within immediate reach. The pharmacist in such cases is prompted by a natural feeling of humanity: the remedy is administered or the bandage applied, and in no instance is any charge exacted for medical services—the parting injunction in every case at all serious being, "Now go and consult your doctor, and tell him what I have done for you." I sincerely hope for the sake of the dignity and self-respect of the medical profession that the accusation is mainly without foundation in fact, and that the instances of a systematic invasion of our prerogative are few and far between, and that on the whole we may afford to ignore them.

The importance of conjoint work in medicine and pharmacy cannot be overestimated, for by this means the requirements of the one profession can be accommodated by the resources of the other. Perhaps one of the best expositions of this subject is contained in a paper from the pen of our esteemed confrere who will furnish the report on the Progress of Pharmacy. The paper was read at the meeting of the American Medical Association, and is entitled "Collaboration in Materia Medica and Pharmacy." Its aim is to demonstrate the utility of an arrangement whereby a joint committee appointed from the American Medical and our own Association, should consider and submit questions of moment in relation to both professions—these questions to come up for discussion and action before the respective Associations. The consummation of this project would have the effect of bringing the two professions in closer touch, because the result of such action would not be confined to the parent Asssociations, but would exert its influence on the members of all the Medical and Pharmaceutical Societies throughout the land. I hope this matter will be taken up at the proper time and freely discussed, and that the author of the paper in question will consent to its appearance in the Proceedings, provided its publication be not in conflict with our established rules.

The coming year will mark an event of great importance in the annals of the American Pharmaceutical Association: and to the profession throughout this country and the civilized world. The International Pharmaceutical Congress will hold its seventh biennial meeting at Chicago, under the auspices of the American Pharmaceutical Association: this as the result of the Italian Society having surrendered its right to hold the meeting at Milan, coupled with the invitation tendered by our Association to hold the meeting at Chicago during the progress of the World's Columbian Exposition.

It was deemed right and proper that a cordial invitation in official form should be sent to all Societies privileged to attend the meeting. With this view a communication in English, French and German, addressed to the Pharmaceutical Societies of all countries, was written and signed by your President and Secretary, and a copy mailed to each. Simultaneously the subject matter was published to the world through the medium of the

Associated Press. Well may we congratulate ourselves on this auspicious event. It will mark an epoch in the annals of our Association replete with interest to its members. It will bring us into closer contact with our confreres from the other hemisphere, and be mutually beneficial to all concerned. This meeting will serve to show our friends from abroad that science is not dormant in the young Republic, that we live in an age of progress, keeping well to the front with our most ardent competitors. American enterprise, scientific research and artistic skill will figure prominently at that great gathering, and by no means the least attractive of the many displays will be that of Pharmacy in its various branches.

The Pharmaceutical section of the World's Congress Auxiliary will secure accommodations for the two bodies; their organization has been perfected, and they will provide for all contingencies. It will be the duty of this Association to entertain our brethern from abroad, and while the local members will doubtless desire to monopolize that function, it is incumbent on us as a body to take an active part and receive and care for our visitors with genuine American hospitality. In view of the sound condition of our financial affairs, I would suggest that a substantial sum be provided from our Treasury to contribute toward the successful prosecution of this measure.

The Committee to whom has been assigned the work of writing the U. S. Pharmacopœia report satisfactory progress, and announce that the result of their labors will shortly be given to the world. One of the prominent features of the work will be the introduction of improved methods of assay and the publication of an extended list of reagents and standard volumetric solutions for chemical analysis.

The records of the past year are not prolific with startling discoveries in the domain of Pharmacy. A notable event in this connection is the method of assay exhibited by Prof. Lloyd at the New Orleans meeting and its later modifications. The rapidity and facility of its application were ably demonstrated on that occasion, and no doubt most of us are now familiar with its utility from personal experience.

Quite a number of new remedies have been introduced, chiefly in the line of synthetic chemicals, which are credited with antipyretic, hypnotic or antiseptic properties. Their appearance is often accompanied with laudatory certificates from prominent authorities, but not always do they stand the test of extended trial, and they are soon forgotten, or only recognized as poor imitations of established remedies in that class. The stimulus to the manufacture of those ephemeral products consists in the pecuniary gain that might follow their successful introduction—as in each case the inventors are protected by letters patent which would secure for them a monopoly. The annoying feature about this class of goods is that we are compelled to carry them in stock, anticipating a demand that does not often arise, and in this way a considerable sum is permanently locked up by being invested in unremunerative material. When the cost of the raw material and method of manufacture is considered, it would seem that the margin of profit is far beyond the range of legitimate figures. At the same time we must admit that the pioneers in that branch of chemical manufacture are rightly entitled to whatever benefits they may have received as the reward of original thought and intelligent research, especially when the excellence of their products is considered.

The progress of pharmaceutical education is evidenced by the flourishing condition of the various colleges and schools of Pharmacy throughout the country. A constantly increasing roll of students and graduates betokens a growing interest and gives promise of a higher standard in the ranks of the incoming members of the profession. This will prove an important step toward the attainment of one of the objects that called into being this grand old institution, viz., the Elevation of Pharmacy.

It may not be amiss to make reference to the affairs of the State Boards of Pharmacy. Pharmacy laws have been established in nearly all the States of the Union. It is to be hoped that in the near future no single exception to that rule will be in existence. An

excellent movement was inaugurated at the meeting of 1890, when the members representing their several Boards of Pharmacy met and formed a permanent organization. It is to be hoped that the body will continue in the work so auspiciously begun, for by this means a definite standard can be established, whereby existing objections to interchange of certificates of examination may be eliminated,

An effort was attempted some years ago to secure the repeal of the internal revenue tax on alcohol for use in medicine and the arts, also that of the license tax on retail druggists. The effort failed, but that failure should not discourage us from renewing the attempt.

The report of the Committee on Membership will disclose the pleasing information that the increase of membership has exceeded that of any previous year. At the same time we are reminded of the uncertainty of human life by the erasure from the roll of membership of the names of thirty of our brethren who have gone to swell the ranks of the silent majority.

I would beg to say a few words on a subject that must evoke a responsive echo from your hearts. In glancing over the roster, we see here and there the names of some that have become familiar to us. They are names worthy to be remembered, whose owners have imposed on us a debt of gratitude, a debt that deserves acknowledgment from this body. They are the names of men who have given to the world the result of their patient labors and inventive genius, who have faithfully served this Association, aiding in its counsels and enriching its literature. By their faithful attendance they have awakened an active interest among their fellow-members. Some of them have not yet passed life's prime, others have grown old in the traces, as their feebler steps and whitening crowns attest. To these some token of appreciation, some tribute of esteem is due. Let it be in the form of an emblem, bearing an appropriate motto or a scroll suitably inscribed. Whatever it be, its owner will cherish it as a precious memento; he will gaze on it with pleasure during life, and bequeath it a valued heirloom to posterity.

I cannot allow the occasion to pass without giving expression to my heartfelt appreciation of the honor you have conferred on me by calling me to preside over your deliberations; and if my feeble efforts fall short of the mark, grant me your indulgence, condone my faults, and overlook my shortcomings; so that when I shall have surrendered the emblem of authority into abler keeping, I shall not have forfeited your esteem nor failed to secure your approbation.

The following is the communication referred to in the President's address:

## AMERICAN PHARMACEUTICAL ASSOCIATION.

*Organized October 7, 1852—Incorporated February 21, 1888.*

### Circular Letter relating to the Seventh International Congress.

*To the Pharmaceutical Societies and the Pharmacists of all Countries, Greeting:*

The American Pharmaceutical Association had extended an invitation to the Third International Pharmaceutical Congress, held at St. Petersburg, in 1874, to call the Fourth Congress in Philadelphia in 1876, during the Centennial International Exposition; but the selection of a city in the United States was deemed unadvisable at that time.

After it had been decided that the World's Columbian Exposition should be held in the City of Chicago in 1893. the American Pharmaceutical Association again invited the International Pharmaceutical Congress to meet in this country. The Italian Committee on Organization having, by circular of May 15, 1891, and for reasons stated therein, renounced the convocation of the Seventh International Pharmaceutical Congress at

Milan; the Executive Committee of the Sixth Congress, at Brussels, by letter of November 26, 1891, confirmed the invitation of the American Pharmaceutical Association; and in a communication of February 16, 1892, the former Committee on Organization at Milan expressed the view, that there was nothing, under the circumstances stated, to prevent the organization of the Seventh International Pharmaceutical Congress in 1893, in Chicago.

Now, in view of the above facts, the undersigned officers of the American Pharmaceutical Association take pleasure in extending a hearty invitation to the Pharmaceutical Societies of all countries to appoint delegates to the International Pharmaceutical Congress, which is to assemble in the City of Chicago during the year 1893, and in which teachers to Pharmaceutical Institutions and Pharmacists in general are likewise cordially invited to participate.

It is especially desired, that the contents of this circular letter be brought to the notice of kindred societies, and that information be given to the undersigned Secretary, relating to suggestions of subjects of general importance, suitable for discussion and action by the Congress, as well as to the intention of Pharmaceutical Societies, of Pharmacists and of Teachers of Pharmacy in other countries, of being present or represented at the Congress of 1893.

Further steps for promoting the objects and deciding upon the date of the Congress will be taken at the meeting of the American Pharmaceutical Association in July of the present year. Meanwhile the undersigned desire to assure all who may come as delegates, as members or as visitors, to the International Pharmaceutical Congress, at Chicago, in 1893, of the very cordial reception on behalf the Pharmacists of the United States of America.

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*Aux Sociétés Pharmaceutiques et aux Pharmaciens de tous les Pays, Salut:*

L'American Pharmaceutical Association avait prié le Troisième Congrès International Pharmaceutique réuni à St. Petersbourg en 1874, de convoquer le Quatrième Congrès à Philadelphie en 1876 pendant l' Exposition Internationale du Centenaire; mais on ne crut pas à cette époque devoir choisir une ville aux Etats-Unis.

Après qu'il eut été décidé que l'Exposition Universelle Colombienne aurait lieu à la ville de Chicago en 1893, l'American Pharmaceutical Association invita encore le Congrès International Pharmaceutique à se réunir en ce pays. Le Comité Italien d'Organisation ayant par une circulaire du 15. mai 1891, et pour les raisons qu'ils mentionnent, renoncé à la convocation du Septième Congrès International à Milan, le Comité Exécutif du Sixième Congrès réuni à Bruxelles, par lettre du 26. novembre 1891, a confirmé l'invitation de l'American Pharmaceutical Association; et dans une communication du 16. février 1892, le Comité d'Organisation à Milan, ci-dissus nommé, a exprimé l'opinion qu'il n'y avait rien dans les circonstances mentionnées que pût empêcher l'organisation du Septième Congrès International Pharmaceutique à Chicago en 1893.

Considérant les faits que nous venons de mentionner, les officiers soussignés de l'American Pharmaceutical Association sont heureux d'inviter cordialement les Sociétés pharmaceutiques de tous les pays à nommer des délégués au Congrès International Pharmaceutique qui doit se réunir à la ville de Chicago durant l'année 1893, et auquel les professeurs aux Institutions Pharmaceutiques et les pharmaciens en général sont cordialement invités à assister.

Il est surtout à désirer, que l'on fasse connaître le contenu de cette circulaire aux sociétés d'une nature analogue à la nôtre et que l'on fasse parvenir au secrétaire soussigné toutes suggestions quant aux sujets d'une importance générale, que le Congrès pourrait considérer, ainsi que l'intention des Sociétés pharmaceutiques, des Pharmaciens et des Professeurs de Pharmacie dans d'autres pays, d'être présents ou de se faire représenter au Congrès de 1893.

D'autres mesures pour la réussite du Congrès et pour en fixer la date seront prises à la réunion de l'American Pharmaceutical Association, en juillet de la présente année. Les soussignés désirent assurer à tous ceux, qui viendraient comme délegués, comme membres ou comme visiteurs au Congrès International Pharmaceutique à Chicago en 1893, que les Pharmaciens des Etats-Unis d'Amérique leur feront la réception la plus cordiale.

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*An die Pharmaceutischen Vereine und die Pharmaceuten aller Lænder.—Gruessend!*

Die American Pharmaceutical Association hatte in 1874 eine Einladung an den dritten Internationalen Pharmaceutischen Congress, in St. Petersburg, ergehen lassen, den vierten Congress nach Philadelphia während der "Centennial" Internationalen Ausstellung in 1876, zu berufen; allein, zu jener Zeit wurde die Wahl einer Stadt in den Vereinigten Staaten für nicht räthlich erachtet.

Nachdem die Abhaltung der Weltausstellung in Chicago, in 1893, beschlossen war, lud die American Pharmaceutical Association abermals den Internationalen Pharmaceutischen Congress zur Versammlung in diesem Lande ein.

Inzwischen hat das Italienische Organisations-Committee, durch Circular vom 15. Mai 1891, und aus dort angegebenen Gründen, auf die Einberufung des siebenten Internationalen Congresses in Mailand verzichtet; und das Executiv-Committee des sechsten Congresses zu Brüssel hat durch Schreiben vom 26. November 1891 der Einladung der American Pharmaceutical Association beigestimmt; ferner wurden wir durch eine Mittheilung vom 16. Februar 1892, benachrichtigt, dass, nach Erachten des früheren Organisations-Committees zu Mailand, der angegebenen Umstände wegen der Organisation des siebenten Internationalen Pharmaceutischen Congresses in Chicago, in 1893, nichts im Wege stehe.

In Rücksicht auf diese Thatsachen beehren sich die unterzeichneten Beamten der American Pharmaceutical Association, hiermit die freundliche Einladung an die Pharmaceutischen Vereine aller Länder ergehen zu lassen, Delegaten zu erennen zu dem Internationalen Pharmaceutischen Congress, welcher sich in Chicago im Jahre 1893 versammeln wird, und an welchem sich zu betheiligen Lehrer an Pharmaceutischen Instituten und Pharmaceuten in Allgemeinen gleichfalls herzlich aufgefordert werden. Besonders wird noch gebeten, den Inhalt dieses Rundschreibens zur gefälligen Kenntniss verwandter Vereine bringen zu wollen; wie auch dem mitunterzeichneten Sekretär Mittheilung zu machen über allgemein wichtige und zur Verhandlung geeignete Fragen, und über beabsichtigte Betheiligung, oder in Aussicht stehende Vertretung pharmaceutischer Vereine anderer Länder auf dem Congress im Jahre 1893.

Zur Förderung des Zwecke des Congresses und zur Festsetzung des Tages des Zusammentretens desselben wird die American Pharmaceutical Association weiter verhandeln bei der Versammlung im Juli dieses Jahres. Inzwischen wünschen die Unterzeichneten allen Delegaten, Mitgliedern und Besuchern des Internationalen Pharmaceutischen Congresses zu Chicago, in 1893, die Versicherung zu geben eines recht herzlichen Empfanges seitens der Pharmaceuten der Vereinigten Staaten von Amerika.

ALEX. K. FINLAY,
*Pharmacist in New Orleans;*
*President of the American*
*Pharmaceutical Association.*

JOHN M. MAISCH,
*Professor of Materia Medica and Botany;*
*Permanent Secretary of the American*
*Pharm. Association.*

*Office of the Permanent Secretary, 143 North Tenth Street, Philadelphia,*
*March 30, 1892.*

On motion of Mr. Hallberg, the President's address was directed to be referred to a committee of three to consider and report upon the

suggestions contained therein, at a future session. The chair appointed Messrs. W. S. Thompson, Henry Canning and M. W. Alexander said committee.

President Finlay occupied the chair.

The Permanent Secretary presented the list of accredited delegates which had been examined by the Council, showing that credentials had been sent or handed in from the following organizations of pharmacists:

*Colleges of Pharmacy:* Chicago, Cincinnati, Denver, Illinois, Louisville, Maryland, Massachusetts, National (Washington), New York, Philadelphia and St. Louis.

*State Pharmaceutical Associations:* Alabama, Arkansas, Colorado, Connecticut, Delaware, Florida, Georgia, Illinois, Indiana, Iowa, Kansas, Louisiana, Maine, Massachusetts, Michigan, Missouri, New Hampshire, New Jersey, New York, North Carolina, North Dakota, Ohio, Oregon, Pennsylvania, Rhode Island, South Carolina, South Dakota, Tennessee, Texas, Virginia, Washington, and the Provinces of Nova Scotia and Quebec.

*County and City Associations:* Cleveland, O.; Houston, Tex.; Kings Co., N. Y.; and German Apothecaries, New York.

*Alumni Associations of Colleges of Pharmacy:* Cincinnati, Massachusetts, Maryland, New York, Philadelphia and St. Louis.

Also from the National Wholesale Druggists' Association.

On motion the delegates were invited to take seats on the floor and to participate in the discussions.

On motion of Mr. Canning, the members present from the State of Kentucky were granted the privilege of appointing delegates, the credentials from the State Association not having been received.

The same privilege, on motion of Mr. Simon, was extended to the members present from the Maryland Pharmaceutical Association.

Delegations intending to fill vacancies were requested to report to the Permanent Secretary.

Mr. Kennedy, Secretary of the Council, reported the names of 289 candidates for membership, with a favorable recommendation from the Council. Pending the motion for election, Mr. Hallberg stated that he might have an objection to offer to one of the candidates, whereupon, on motion of Mr. Good, voting upon the admission of the applicants to membership was postponed until the next session.

Reports of Committees being called for, the following were read by title: on Prize Essays; on International Pharmaceutical Congress; on National Formulary; and of the delegation to the American Medical Association. The reports were laid upon the table, to be called up later.

The following telegram was read:

BOSTON, *July* 13, 1892.

*To the Secretary of the American Pharmaceutical Association, Profile House:*

Unexpectedly detained. Please convey to the Association the hearty sympathy of the American Medical Association.

HENRY O. MARCY,
*President.*

A recess of five minutes was taken to enable the members from the dif-

ferent States to consult together, when upon reassembling the following appointments for the Nominating Committee were made by the members then present from the different States:

*Columbia, Dist.:* J. W. Hodges, A. Nattans.
*Connecticut:* C. A. Rapelye, T. F. Main.
*Florida:* L. S. Smith, S. P. Watson.
*Georgia:* H. Sharp, T. H. Cheatham.
*Illinois:* A. E. Ebert, P. J. H. Behrens.
*Indiana:* J. K. Lilly, G. W. Sloan.
*Iowa:* J. H. Pickett, W. H. Torbert.
*Kentucky:* E. C. Pfingst, J. W. Gayle.
*Louisiana:* F. C. Godbold, L. F. Chalin.
*Maryland:* D. M. R. Culbreth, C. E. Dohme.
*Massachusetts:* E. L. Patch, M. L. Lavitt.
*Michigan:* A. B. Stevens, J. Jesson.
*Missouri:* J. M. Good, H. M. Whelpley.
*New Hampshire:* C. A. Tufts, E. H. Currier.
*New Jersey:* W. C. Alpers, Rich. Stabler.
*New York:* C. O. Rano, B. T. Fairchild.
*North Dakota:* H. L. Haussamen.
*Ohio:* C. B. Johnson, G. L. Hechler.
*Pennsylvania:* J. H. Stein, E. A. Cornell.
*Rhode Island:* M. B. Wood, W. E. Cates.
*Tennessee:* J. O. Burge.
*Texas:* J. Burgheim.
*Virginia:* M. E. Church.
*Wisconsin:* J. A. Dadd, C. H. Bernhard.
*Nova Scotia:* F. C. Simson.
*Quebec:* E. Muir.

In addition to these the President appointed from the Association at large Messrs. C. L. Diehl, J. Ingalls, C. T. P. Fennel, C. L. Keppler, and G. Ramsperger members of the Nominating Committee.

Mr. Kennedy as Secretary of the Council read the minutes of this body since the last annual meeting, all of which were subsequently, on motion of Mr. Nattans, duly approved. These minutes give the following information:

The Secretary reported that since the last meeting the following business had been transacted by correspondence.

The following communication with resolutions attached was submitted:

PHILADELPHIA, *May* 18, 1891.

*To the Chairman of Council:*

*Dear Sir:* The newly elected Reporter on the Progress of Pharmacy, Dr. Chas. Rice, has accepted the office, but owing to his duties as Chairman of the Committee of Revision and Publication of the Pharmacopœia of the United States of America, he will be compelled for the first year, beginning July 1, 1891, and until the new Pharmacopœia is published, to have the compiling of the papers for the report done by a competent person under his personal supervision. The Permanent Secretary respectfully suggests to the Chairman of the Council that this proposition be approved in compliance with Chap. V., Art. V., of the By-Laws, as being "the best arrangements they can command to continue the work to its completion." If the foregoing be approved, it will, of course, become necessary that the person engaged be paid for his services at regular stated intervals, instead of "in two equal instalments, one on March 1st, and the second at the expiration of the term of office," as fixed by resolution of the Council, September 8, 1890. (See Proceedings 1890, page 8.) I, therefore, move:

1. That so much of this resolution of the Council as refers to the salary of the Reporter on the Progress of Pharmacy, be suspended until after the new Pharmacopœia of the United States of America shall have been published.

2. That in the payment for the compilation of the report, upon the written request of the Reporter on the Progress of Pharmacy, duly approved by the Finance Committee, the

Permanent Secretary be directed, during the suspension of the Council's resolution, at the end of each month following July 1st, next, to issue an order for a sum not exceeding $50.00, and the Treasurer to draw a check for such amount in favor of Mr. Charles Rice.

Respectfully submitted.

JOHN M. MAISCH,
*Permanent Secretary.*

Seconded by H. M. WHELPLEY.

The resolutions were adopted unanimously, Mr. P. C. Candidus not voting.

The following communication with resolution was submitted:

PHILADELPHIA, *May* 19, 1891.

*To the Council, American Pharmaceutical Association :*

The undersigned respectfully reports that the General Index for the Proceedings from 1883 to 1890 inclusive is finished in manuscript. It has been found impossible to correctly estimate the number of pages it will make in print, the estimates by different persons familiar with such work varying between 125 and 160 pages like those of the General Index published in 1884, which would make the expense for composition, paper and printing between $440 and $560. The Index of 1884, covering 178 printed pages, had cost $687. To make the Index as perfect as possible, it is of importance that the compiler, Mr. H. M. Wilder, should read the proof-sheets. For these reasons it is moved:

1, That the Committee on Publication be instructed to have the General Index for the years 1883 to 1890 inclusive, published on as favorable terms as possible;

2. That the General Index be bound with the volume of the Proceedings for the year 1891; and

3. That Mr. Wilder be engaged to read the proof-sheets of the General Index, at a compensation not to exceed $25.

Respectfully submitted,

J. M. MAISCH,
*Permanent Secretary.*

I second the above motion.

CHARLES RICE,
*Chairman Committee on Publication.*

The resolutions were adopted by a unanimous vote, Mr. P. C. Candidus not voting.

Under date of June 20th, the following was communicated:

*To the Members of the Council of the American Pharmaceutical Association :*

Some of the members of the Committee for revising the National Formulary having expressed the desire of being furnished with an interleaved copy of the Formulary, and the request having been approved by the Chairman, Professor Diehl, in view of facilitating the labors of the committee; it is *moved* by J. M. Maisch, that the Permanent Secretary be directed to supply each working member of the Committee named with an interleaved copy of the National Formulary, bound in sheep, as far as the stock on hand will permit; the remainder to be taken from those bound in cloth.

The above motion is seconded by Chas. T. P. Fennel.

It was unanimously adopted, the seventeen members of the Council voting in favor.

*Pottsville*, October 1, 1891: It is moved by H. M. Whelpley and seconded by Geo. J. Seabury,

That, acting in the interest of the Commercial Section of the A. P. A., the President of each State Pharmaceutical Association be invited by our President to appoint one

person as a representative of his Association to attend the meeting of the National Wholesale Druggists' Association, to be held on the 19th of October, 1891, at Louisville, Ky.

*Ayes:* Conrath, Dawson, Dunning, Eliel, Fennel, Good, Goodman, Maisch, Rice, Seabury, Sheppard, Thompson, Torbert, Whelpley and Whitney—15.

*Not voting:* Candidus and Finlay—2.

The communications of October 2 and November 2, 1891, relating to the place and date of the fortieth annual meeting, were published in the "Proceedings" for 1891, pages 671 and 672.

POTTSVILLE, PA., Oct. 20, 1891.—It is moved by S. A. D. Sheppard and seconded by H. M. Whelpley, that the Treasurer of the American Pharmaceutical Association be instructed to draw from the cash on deposit a sufficient sum and purchase therewith three bonds, one thousand dollars each, the same to be such bonds as shall be approved by the Finance Committee. Said bonds to be registered in the name of the Treasurer of the American Pharmaceutical Association, and placed in the custody of the Chairman of the Council.

Carried by sixteen affirmative votes, Mr. P. C. Candidus not voting.

POTTSVILLE, PA., Jan. 11, 1892.—It is moved by W. H. Torbert and seconded by H. M. Whelpley, that an amount not exceeding two hundred and fifty dollars ($250) be and the same is hereby voted to be added to the appropriation of the two hundred dollars ($200) made at New Orleans, to cover the expenses of the Committee on plan to regulate prices on proprietary articles. See Proceedings of meeting at New Orleans, page 41.

*Ayes.*—Conrath, Dawson, Dunning, Fennel, Finlay, Good, Goodman, Rice, Seabury, Sheppard, Torbert, Whelpley, Whitney—13.

*Nay.*—Eliel—1.

*Nay, conditional.*—Thompson—1.

*Not voting.*—Candidus—1.

*Declining.*—Maisch—1.

If the above appropriation is to cover expenses already incurred, I vote Aye; on the contrary, if it is in anticipation of expenses to be incurred in the future prosecution of the work, I vote No. W. S. THOMPSON.

*Washington, D. C.*

I must decline voting on Mr. Torbert's resolution in the present form. The Association has appropriated for a certain purpose a sum *not exceeding* $200. It may be considered doubtful, perhaps, whether the Council has the power to vote a larger sum in addition for the same purpose. Such power can only be derived from Chap. VI, Art. I of the By-Laws, on the transaction of business for the Association between the times of meeting. To justify the Council in entertaining such a motion, it should be placed on record whether the sum appropriated has been expended, and for what reasons an additional larger sum is needed. This, it seems to me, is due to the members of the Council, so that they may vote intelligently on the question, and also due to the members of the Association, who should be informed through the printed minutes of the causes leading to such a transaction. JOHN M. MAISCH.

The following communications and resolution were submitted to the Council under date of February 8, 1892.

MR. W. H. TORBERT, *Chairman Section on Commercial Interests American Pharmaceutical Association:*

*Dear Sir:* One of the wisest conclusions arrived at by the Tripartite Committee at its recent meeting, was that of submitting the proposed form of contract or agreement relating to the sale of proprietary goods on the American Pharmaceutical Association plan to the retail trade of the country for an expression of its will in the matter—yes or no.

Of course, such a move means a large outlay: for instance, 36,000 stamps alone amount to $720.00; add to this 72,000 envelopes (one for return) and addressing, printing of circulars, clerical labor in sending out and tabulating returns, etc., etc.

The Committee on the part of the American Pharmaceutical Asssociation will, as far as I can judge (although the returns are not all in) be obliged to exceed the amount already granted by the Council. Each branch of the Tripartite Committee pledged its own national organization for its proportionate part of the expense, and I am sure that the American Pharmaceutical Association will back us up. It is the first opportunity, financially, that the Association has had to prove its interest in the Commercial Section. The Association is abundantly able to meet the obligation, but it does not seem fair to ask these three representatives to carry the amount until the meeting in July. Therefore, I respectfully petition the Council through you, as Chairman of the Commercial Section, to grant an amount sufficient to pay the Association's part of the expense incurred in bringing the American Pharmaceutical Association plan before the trade, remembering that *it is the American Pharmaceutical Association's own plan.*

I cannot state an exact amount, but will see that there is no injudicious expenditure.

Not wanting "snap judgment" on the part of any member of the Council, is my only excuse for so lengthy a presentation of the case.

Fraternally yours,
HENRY CANNING,
*Chairman Tripartite Conference Committee.*

*Boston, January 29, 1892.*

BOSTON, MASS., January 27th, 1892.

MR. HENRY CANNING, *Chairman of Committee on Plan for Prevention of Cutting:*

*Dear Sir:* I consider the work of your Committee so important to the Association, and to the druggists of the United States, that I most cheerfully urge the Council to authorize the expenditure of a large sum of money to accomplish so desirable a result.

Yours very truly,
S. A. SHEPPARD.

It is moved by W. H. Torbert that the Council of the American Pharmaceutical Association authorize the expenditure of a sufficient sum, not to exceed $500, for its share of the tripartite expenses in bringing before the retail trade the A. P. A. plan for approval.

For the reasons stated in Mr. Canning's letter, I second the foregoing motion.

Signed, JOHN M. MAISCH.

*Ayes.*—Candidus, Conrath, Dawson, Fennel, Finlay, Good, Goodman, Maisch, Rice, Seabury, Sheppard, Torbert, Whelpley and Whitney—14.

*Nay.*—Eliel—1.

*Not Voting*—Dunning, Thompson—2.

On motion of Mr. Thompson the foregoing minutes were approved.

Mr. Kennedy read the following report, which was accepted and referred to the Association:

## REPORT OF COMMITTEE ON MEMBERSHIP.

*To the Chairman and Members of the Council of the American Pharmaceutical Association:*

*Gentlemen:* As Secretary of the Committee on Membership, I have the honor to transmit my official report. Shortly after adjournment of our last meeting, held in the city of New Orleans, the usual invitation was mailed to each one of those who were recommended and accepted as proper persons to become members of our Association, and in compliance with a resolution adopted at the second session, your Secretary sent a second notice to persons invited to become members four months after the first notice, in case no response had been received; the result of this second notification, was the addition of five names to the roll of membership. The total number invited at our last meeting was 176, and of this number 139 became members, or about 80 per cent., which shows a large increase when compared with former years, under the operation of the new system of receiving new members; two delegates also became members, making a total increase of 141. They are credited to thirty States, one Territory, District of Columbia, Canada and England.

Mr. H. M. Whitney, Local Secretary, recommended to your Secretary that a circular letter, together with a blank application for membership, be sent to pharmacists residing in the New England States; the object being the increasing of our membership in these States. The proposition was submitted to the Chairman, H. M. Whelpley, who approved of the plan. Three thousand circulars and the same number of applications were printed and mailed to druggists residing in Maine, New Hampshire, Vermont, Massachusetts, Connecticut and Rhode Island.

From the applications and propositions thus far received, it seems likely that the accessions to membership will be quite numerous at this meeting.

Since the publication of the Proceedings for 1891, the following gentlemen proposed at the New Orleans meeting have completed their membership:

John S. Gibson, Hope, Ark; C. A. Gilbert, Boston, Mass.

*Report of Membership.*

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| Members in good standing at last report | | 1309 |
| Members elected since last report | | 139 |
| Members received as delegates | | 2 |
| *Total Membership* | | 1450 |

*Loss in Membership.*

| | | |
|---|---|---|
| By resignation | 25 | |
| By death | 29 | |
| Dropped from roll for various causes | 00 | |
| *Total loss* | | 54 |
| Number in good standing at this report | | 1396 |

*Honorary Membership.*

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|---|---|
| Number on the roll at last report | 23 |
| Loss by death | 2 |
| Number on the roll at this report | 21 |

While we have been busy in the pursuit of our calling, and many changes have taken place in our professional and personal relations, death has cut down some of our most honored and useful members. The following list comprises the largest number of deaths reported by me, since it became my duty in 1874 to report obituary notices of deceased members:

James H. Benjamin, New York.
Emery G. Bissell, New York.
Wm. B. Blanding, Providence, R. I.
Francis M. Brooks, Baton Rouge, La.
Albert P. Brown, Camden, N. J.
Samuel Campbell, Philadelphia.
Solomon Carter, Boston, Mass.
Geo. W. Coggeshall, New York.
W. B. French, Albany, N. Y.
Henry W. Fuller, New York.
Edmund Gregory, Lindsay, Ont., Canada.
Frederick Hale, Boston, Mass.
Wm. H. Henes, Bay City, Mich.
H. H. Herman, San Jose, Costa Rica, C. A.
John F. Judge, Cincinnati, O.
Wm. H. Keeler, Saginaw City, Mich.
Alfred Mayell, Cleveland, O.
C. J. McCarthy, Shenandoah City, Pa.
Jno. J. Mellon, New Orleans, La.
James S. Melvin, Boston, Mass.
John A. Niebrugge, Brooklyn, N. Y.
Jesse W. Rankin, Atlanta, Ga.
Isaac N. Reed, Toledo, O.
Wm. S. Schiller, Baltimore, Md.
Walter A. Walling, Providence, R. I.
Francis Weichsel, Dallas, Tex.
George W. Woodbridge, Boston, Mass.
Chas. Wright, New Orleans, La.
Wm. A. Wright, Memphis, Tenn.
Dr. J. Redwood, London, Eng.
George W. Sanford, London, Eng.

*James H. Benjamin*, of Brooklyn, New York, died there after a short illness. Deceased conducted the drug business for a number of years in Brooklyn, and owing to his close attention to business, was successful in establishing a good trade. Of late years he attended the meetings of our Association, and was one of the party who went to San Francisco. He became a member of our Association in 1878, at Atlanta, Ga.

*Emery G. Bissell* died at Waterville, N. Y., on September 2, 1891, after a long illness, the result of a brain tumor. He was born and educated at Waterville, and also learned the business at that place with his father. After graduating from the Philadelphia College of Pharmacy in 1877, where he stood fifth in a class of ninety-seven, he entered into partnership with his father and brother, under the firm name of W. J. Bissell & Sons. The deceased was for more than twenty years in active business, at all times promoting in the interest of his profession, and was an esteemed member of the New York Pharmaceutical Association. His graduation thesis on "Hop Culture and the Constituents of the Hop" was published in the American Journal of Pharmacy. At his home in Waterville he was held in high esteem, and enjoyed the confidence and respect of a wide circle of friends and acquaintances. The deceased at the time of his death was forty-one years old. Nine years ago he married Miss Emma Gentry, who with two children, a son and a daughter, mourn the loss of a good father and a loving husband. Mr. Bissell became a member of our Association in 1879, at the meeting held in Indianapolis.

*Wm. B. Blanding*, of Providence, R. I., died there May 27, 1892. Mr. Blanding was born in Providence, August 2, 1826, and was therefore in his sixty-sixth year at the time of his death. He attended the public and private schools in his native city, and received a classical education. At the age of 18 he entered the drug store of Edward T. Clark, and soon attained a proprietary interest, succeeding to the business in 1849. In 1873 he bought the stock of Dyer Bros., on Weybosset street, where he carried on the wholesale drug business. The original retail store was continued at the old stand until it was removed to 48 North Main St., in 1881. In 1882, Mr. Blanding purchased the stand for a long time occupied by Dr. Thomas W. Eddy & Son, on High street. Since the organization of the State Board of Pharmacy in 1870, Mr. Blanding has been one of its members, and has also been President of the Rhode Island Pharmaceutical Association. Mr. Blanding held many positions of trust and honor. He leaves a widow and one son. Deceased became a member of our Association in 1875, at Boston, Mass.

*Frank M. Brooks* died at Baton Rouge, La., June 18, 1891. Deceased was born in Baton. In 1865 he began the study of pharmacy, and later on, after serving a regular apprenticeship to the business, purchased and conducted a pharmacy of his own with un-

varying success up to the time of his death. He graduated as a physician in the University of Louisiana and practiced medicine in the years 1877–8, but pharmacy was more congenial to his taste, and resigning the practice of medicine he returned to his first love. The personal character of the man abounded in admirable traits, not the least of which was unswerving honesty. Possessed of a fine sense of right, he strenuously maintained it, faithfully adhering to his convictions. He enjoyed in a remarkable degree, the faculty of making and keeping friends. He did much to improve the cause of pharmacy; a staunch supporter of its advancement, he was ever ready to aid and encourage its progress. His confreres of the Louisiana State Pharmaceutical Association in 1889 elected him to the presiding office of their body, a position he filled with distinguished ability and grace. In the social relations his life shone bright and beautiful. He was a devoted husband, affectionate parent, true friend, and always the gentleman. Mr. Brooks' membership in our Association dates from the meeting held in Indianapolis, in 1879.

*Albert P. Brown*, of Camden, N. J., was born in Philadelphia in 1840, and after attending the public schools, became an apprentice at the pharmacy of Wm. B. Webb. Shortly after graduating from the Philadelphia College of Pharmacy in 1862, he removed to Camden, N. J., where he established a drug store, and continued in the business until the time of his death. He took quite an interest and soon became prominent in pharmaceutical matters in New Jersey; was Recording Secretary of the State Pharmaceutical Association from 1876 to 1884, when he was elected its President for the succeeding year, and for over eight years was Secretary of the State Board of Pharmacy. He was a member of the Philadelphia College of Pharmacy over twenty years, much of the time doing service in the Board of Trustees. On the organization of the Alumni Association of the Philadelphia College of Pharmacy, he served as a member of the Executive Board, became Vice-President in 1872, and in 1878 was elected President. He devoted much of his leisure time to work with the microscope and to the photographing of microscopical objects, his productions in both these departments being characterized by scrupulous accuracy and attractive neatness. When the Alumni Association decided to afford to the students of the college the opportunity of familiarizing themselves with microscopical work, Mr. Brown was placed in charge of this new laboratory, and it is due to his enthusiasm in this kind of work that many difficulties were surmounted, and that he remained at his post of accepted duty, though his health had become considerably impaired through an attack of the grippe, developing into tuberculosis of the throat, which disease terminated his life April 19, 1892. His widow and a son survive him. Deceased became a member of our Association at the meeting held in the city of Baltimore in 1870.

*Samuel Campbell*, of Philadelphia, died February 19, 1892, of phthisis. The deceased was born in Philadelphia, March 9, 1836. After graduating from the Philadelphia College of Pharmacy, in 1857, he was connected with H. C. Blair and with Alfred B. Taylor, both of Philadelphia. Subsequently he engaged in business on his own account, at No. 911 Walnut St. He afterwards accepted the position of superintendent of the fluid extract department of John Wyeth & Bro., a position he retained until early in 1891, when he resigned to accept the control of the laboratories of Henry K. Wampole & Co. The deceased was a well-known pharmaceutical chemist of marked ability. He possessed an enviable reputation for practical ability in his profession, and many warm and sincere friends deplore the death of a colleague whose character was such a type of combined geniality and truthfulness. He joined the Alumni Association of the Philadelphia College of Pharmacy in 1866. His membership in our Association dates from the meeting in Cincinnati in 1864.

*Solomon Carter*, of Boston, died at Savannah, Georgia, of pneumonia, April 11, 1892. He had been in delicate health and had gone south for recuperation. Mr. Carter was born in Lancaster, Mass., January 19th, 1816. His parents removed to Boston while he

was quite young, and he received his education in the public and private schools of that city. He became an apprentice to the drug business with Gregg and Hollis, afterward Thomas Hollis. In 1839, Mr. Carter, having learned the drug trade thoroughly as it was conducted in those days, started in the retail business at the West End. Subsequently he removed to Hanover street, where he carried on the wholesale and retail drug business for about thirty years under the various styles of Solomon Carter, Carter, Colcord & Preston, and Carter, Rust & Co. In course of time he sold out to the partners of the last named firm, and formed a concern which located on Washington street, opposite School street, which firm was known as Carter & Wiley. Some time after Mr. Carter bought out Mr. Wiley's interest, and then a new firm was formed under the firm style of Carter, Harris & Hawly, which firm continued to exist and flourish until the formation of the present firm of Carter, Carter & Kilham, of which Mr. Carter was the head at the time of his decease. Mr. Carter was the oldest druggist in active trade in Boston, and, indeed, in the State of Massachusetts. He was a member of the National Wholesale Druggists' Association and the Massachusetts College of Pharmacy. As a business man he was well and widely known and universally beloved and respected for his uniform courtesy and unquestioned integrity; for those qualities it was that he enjoyed the unstinted confidence of all with whom he came in contact. He had a very wide acquaintance in the drug trade, where his sterling qualities won him many close personal friendships. In 1865 the deceased became a member of our Association at Boston.

*George D. Coggeshall* died at Orange, New Jersey, November 5th, 1891, at the ripe old age of 84 years. He enjoyed for a long time the distinction of being the oldest living graduate in pharmacy, having graduated in Philadelphia in 1828. His career was an eventful one in pharmacy. His activity was useful at the organization of the New York College of Pharmacy, which institution he served faithfully in various positions for several years. He was a delegate to the convention of Colleges of Pharmacy in 1851, and also at the National Pharmaceutical Convention in 1852, serving as Recording Secretary of that body. In 1853 he was elected First Vice-President of our organization. His life presents a useful example—earnest labor in youth and early and mid-manhood, followed by an old age ripe with the fruits of earlier efforts.

*William B. French*, of Albany, New York, died there March 26, 1892, at the age of 46 years. For 25 years he was identified with the house of the D. H. Fonda Drug Company, and was esteemed by all as an excellent business man. He was a member of the National Wholesale Druggists' Association, and was very much interested in its success. He became a member of our Association at the meeting held in Saratoga Springs in 1880.

*Henry W. Fuller*, of New York city, died at the home of his son in New Rochelle, N. Y., June 28, 1892, at the age of 61. He attended Bowdoin College, where he studied chemistry under Professor Cleveland. In 1852 he married Sarah R. Ladd. Soon afterward he bought the business of G. W. Ladd, his wife's brother, in Bangor, Maine. In 1857 Mr. Fuller moved to Chicago, having sold out his business in Bangor. Soon after his arrival in Chicago he entered the drug firm of Fuller & Finch, afterward Fuller, Finch & Fuller, and later Fuller & Fuller. Mr. Fuller continued a member of the firm for nearly thirty years, retiring in 1886 on account of ill health. In 1887 he again entered business, and became manager of the New York Quinine and Chemical Works. Two years later he retired permanently from active business life, and went to live with his son at New Rochelle. Mr. Fuller was connected with a number of societies, he was President of the Illinois State Microscopical Society for several years, and a member of the Royal Microscopical Society of London, England. He leaves a son and a married daughter, Mrs. Sanders, wife of the American Vice Consul at Nassau. His only brother is Chief Justice Fuller, of the United States Supreme Court. Deceased was elected a member of our Association in the year 1865, at the meeting held in the city of Boston.

*Edmund Gregory*, of Lindsay, Ontario, Canada, died there after a short period of illness. The deceased was a man very attentive to business, and was exceedingly particular as to the quailty of goods dispensed in his store. He took a great interest in everything which had a tendency toward elevating pharmacy. Mr. Gregory became a member of our Association in 1875, at the meeting held in the city of Boston.

*Frederick Hale*, of Boston, died there quite recently. Deceased, who formerly resided in New York, was one of the oldest members of the Association, having been elected a member in 1855, at the meeting held in the city of New York.

*William F. Henes*, of Bay City, Mich., died there in February, 1892. After serving a regular apprenticeship to the pharmaceutical business, Mr. Henes located in Bay City and started business for himself, which he conducted successfully. Deceased was considered one of most conscientious apothecaries in the State. He was respected and honored by all who knew him for his fair dealings. Mr. Henes became a member of our Association at Philadelphia in 1876.

*Frederick F. Hermann*, of San Jose, Costa Rica, died April 28, 1892, of pneumonia, at the age of 37 years. Mr. Hermann was of German parentage, though his home had been in Costa Rica since childhood. For a few years he was clerk in Ehrman's pharmacy during the period he was attending the lectures of the New York College of Pharmacy, from which he graduated at the head of the class in 1875. He was highly esteemed by all who knew him, and in San Jose was the leading pharmacist. He was a member of the Alumni Association of the New York College of Pharmacy. He attended the meetings at Detroit and New Orleans of our Association, of which he became a member in 1888 at Detroit.

*John F. Judge*, of Cincinnati, Ohio, died at Hartwell, O., of paralysis, on October 17th, 1891. Mr, Judge was born in St. Augustine, Fla., in 1842, but most of his life was spent in the city of Cincinnati. Deceased was a practitioner of both medicine and pharmacy, but was especially identified with the latter profession. He was one of the first to advacate the organization of a college of pharmacy at Cincinnati, and worked energetically to promote its institution. He was one of the charter members, and filled the position of Presideut of the Board of Trustees several terms, had held the professorship of chemistry in the college, and was member of the first Pharmaceutical Examining Board of Cincinnati. Deceased was also a professor of chemistry in the Eclectic Medical College of Cincinnati. He was a man of bright intellect, quick perception, an excellent parliamentarian, a thorough pharmacist, in chemistry an excellent scholar and admirable teacher. Deceased united himself with our association at the meeting held in Detroit in 1866.

*Wm. H. Keeler*, on September 25, 1891, died at the home of a friend, 315 North Fayette Street, Saginaw, Mich. To his many friends this announcement was not unexpected, for it was evident for some time that the struggle could have but one termination. Mr. Keeler was born at River, near Dover, England, January 18, 1848. When about 13 years of age he entered the employ of a drug firm, where for eleven years, by faithful service and studious habits, he proved himself an unusually competent pharmacist, possessing a thorough knowledge of men and books, gained so frequently more perfectly by those whose education is obtained under difficulties. In 1871 he was married, and in the spring of that year came to America and located at Monroe, Mich., where he resided for one year, going thence to Saginaw. Here he entered the employ of Wm. Moll, and afterwards took charge of Mr. Moll's branch store. In 1879 he commenced business for himself, having John G. Hogeboom as partner. This business was continued for nearly twelve years. Four years ago, Mr. Keeler's health began to fail. Two years ago he went to England and remained there four months. returning but little benefited. Soon after his return lung complication developed, and he went to the Pacific Coast. He remained until June, 1891, when he returned to Saginaw, where he died.

Mr. Keeler's life was a busy one; every public enterprise found in him a willing helper, and no trust was ever accepted but to be faithfully discharged. He was a friend to every one, and his willingness to lend a helping hand was only equaled by his tact and delicacy in knowing when and how to do it. Although no near relative except his wife lives this side of the Atlantic, he will be mourned as sincerely as though he had been a brother by scores who knew him as a friend. Deceased was a member of the Michigan State Pharmaceutical Association. He became a member of our Association in 1872, at the meeting held in Cleveland, Ohio.

*Alfred Mayell*, of Cleveland, Ohio, died April 15, 1891. Deceased was born in Albany, N. Y., 1845. Mr. Mayell engaged in the drug business in Cleveland about twenty-five years ago, and after a hard struggle succeeded in establishing a business which at the time of his death was second to none in the State. His professional standing was always of the highest, and he took an active part in furthering the cause of pharmacy as a profession. He was a charter member and one of the incorporators of the Ohio State and City of Cleveland Pharmaceutical Associations. Mr. Mayell's connection with our Association dates back to the meeting in Cleveland in 1872.

*C. J. McCarthy*, of Shenandoah City, Pa., son of ex-Prothonotary McCarthy, of St. Clair, died at his late home in Shenandoah City after a lingering illness. Deceased was 29 years of age, and graduated from the Philadelphia College of Pharmacy in 1886. He received a good common school education, after which he began the study of pharmacy in Schuylkill county. Afterwards he entered the establishment of Bullock & Crenshaw, and remained with them until he graduated. Shortly after graduating he began business for himself in Shenandoah City. He married Miss Mary Mullen, of Shamokin, daughter of the well known iron manufacturer, by whom he leaves a four-year-old daughter. He was a young man of bright promise, courteous, honorable, and his many good traits surrounded him with a large circle of friends, who will be pained on learning of his demise. Deceased became a member of our Association at the meeting held in Providence in 1886.

*John J. Mellon*, a highly esteemed and public spirited citizen of New Orleans, died at his residence in that city May 8th, 1892, after a brief illness of Bright's disease, in the fifty-seventh year of his age. The deceased was a native of Wilmington, Del. He received a thorough education at St. Mary's College, in his native town. When he had completed his studies he engaged in the drug business, and was for a time connected with one of the largest wholesale houses in New York. Later he went South, settling in Plaquemine parish in 1859, and finally in New Orleans in 1860. He became manager for Wheelock, Finlay & Co., and later for I. L. Lyons & Co., which latter position he filled at the time of his death. He was chairman of the Entertainment Committee during the last meeting of our Association, and by his exertions contributed much toward rendering that meeting a social success. Mr. Mellon became a member of our Association in 1883, at the meeting held in the city of Washington, D. C.

*James S. Melvin*, of Boston, Mass., died December 13, 1891. He was born at Georgetown, D. C., March 4, 1820. He began his business career in the apothecary business in the store of David Kimball, Portsmouth, N. H., being then but 11 years old. He removed to Boston in 1842, and secured a position with Smith & Fowle. In the course of two or three months this firm was dissolved; Mr. Fowle continued the business, and Mr. Smith formed a co-partnership with a Mr. Perry under the firm name of Smith & Perry. He remained with Seth W. Fowle about two years. In 1844 he obtained a position with Smith & Perry. Mr. Perry retiring in 1847, he was admitted as a partner, the style of the new firm being Smith & Melvin. On January 1, 1865, Mr. Jno. S. Badger was admitted to this firm; on the retirement of Mr. Smith in February, 1867, the firm name was changed to Melvin & Badger. The business is still conducted under this title. He retired from business January 1, 1885. He was one of the oldest mem-

bers of the Massachusetts College of Pharmacy, also a leading member of the "Boston Druggists' Association." He was a man of sterling character and was held in the highest esteem by all who knew him. Deceased was one of the old members of our Association, having connected himself with it in 1853, at Boston.

*W. C. Milburn*, of Washington, D. C., died near Alexandria, Va., August 7th, 1891, aged 50 years. He was born in Alexandria, Va., and was educated at Hallowell's School in that city, and was apprenticed to the drug business in 1860. In 1866, he purchased a pharmacy in Washington, D. C., and continued in business until a short time before his death, when ill health compelled him to dispose of his store. He was a member of the first graduating class of a school of pharmacy at the National Capital, for many years a member of the National College of Pharmacy, and served for some time as one of its Trustees. Mr. Milburn, although fond of ladies' company, never married. His character was open, frank and sincere. He never hesitated to maintain his convictions, yet he was not disposed to thrust his opinions on any one uncalled for. He belonged to a family of pharmacists, and himself and three brothers belonging to that profession, the oldest one, Mr. Jno. A. Milburn, being the Washington agent of our organization. On August 11, 1891, the National College of Pharmacy, at a meeting called for the purpose, passed resolutions in memory of their deceased fellow member and associate. It may well be said of him that in his death the public has lost an upright and valuable citizen, the poor a kind friend, and the profession of pharmacy a willing worker and a skilled and conscientious member. He became a member of our Association at the meeting held in Washington, D. C., in 1883.

*Jno. A. Niebrugge*, of Brooklyn, New York, died there of pneumonia, brought on by an attack of the "grippe." Deceased after receiving a good education in the public and private schools, commenced the study of pharmacy, and after preparing himself to conduct a drug store, he began business on his own account, which proved successful, due to his strict attention to business and the honest manner in which his patrons were treated. He was respected by all who knew him. Deceased became a member of our Association at the meeting held in the City of New York, in 1860.

*Jesse W. Rankin* died at his residence in the city of Atlanta, Ga., on February 25, 1892. Mr. Rankin was born in Quincy, Florida, July 19, 1839, from which place his family removed soon after to Louisiana. Here they remained six years, when another move was to Georgia, where settlement was made at Woodstock, in Oglethorpe county. The boy was early thrown upon his own resources, for when he was but seven years old his father died, which event was followed soon after by the death of his mother. The youth, however, gained an education in Woodstock, and at about the age of seventeen moved to Augusta, Ga., where he started in the drug business as clerk. He was married at Augusta, in 1860. Leaving Augusta about 1869, he became a partner in the firm of Hunt, Rankin & Lamar, of Macon, and managed that business for eight years, till 1875, when the firm establishing a house in Atlanta, he removed to that city to assume charge of the new enterprise. Shortly after this change his wife died; subsequently he married again, and at his death left nine children. Deceased organized the Swift Medical Company in 1876, and remained at its head until his decease. He was a man of marked ability, and owing to his judgment, skill and enterprise, the many things which he took hold of were successful. Personally, he was popular, highly esteemed and beloved, hence his loss will be keenly felt by his business associates and his many friends. He became a member of our Association at the meeting held in Toronto, Canada, in 1877.

*Isaac N. Reed*, of Toledo, O., died at his residence, in that city, October 3d, 1891. The cause of his death was consumption, from which disease he had been suffering for a long time, and which was caused and greatly aggravated by the hard and unceasing labor which Mr. Reed has always put upon his business. He was born in Lucas Co., Ohio, November 24th, 1846, and at the time of his death was 45 years of age. When 13 years

of age he was employed on one of the railroads, up to this time having received no education whatever. When 15 years of age he started to school. His progress was so rapid that at 18 he entered Baldwin University, where he received the first lessons in the profession which became his life-work. After graduation he taught school for a term, but at the close of this time his health was so impaired that he was compelled to seek employment in the open air. He again found employment with the railroad, where he remained for several years. In 1871 he purchased the interest of M. W. Plain in the wholesale drug firm of Plain, Williams & Co., of Toledo. The firm was reorganized under the name of Reed, Williams & Co., and did an extensive business for about three years, when an opportunity was presented to him to purchase the retail store at the corner of Summit and Madison streets, which he managed until his death. During the fifteen years which he conducted this business, his success has been such that he has made himself widely known among the pharmacists of the country. He was a zealous and active worker in the cause of pharmacy and its elevation to a profession. In 1881 he was elected President of the Ohio State Pharmaceutical Association. He did much in the way of obtaining proper legislation as regards pharmacy, and his, "Reed's Pharmacy Act," as a law for controlling and directing the practice of pharmacy, is well known in the United States. He was one of the five wholesale druggists who met in Toledo in 1875 and organized the Western Wholesale Drug Association, from which has sprung the National Wholesale Druggists' Association. His wife and five children survive him. He was elected a member of our Association at Kansas City in 1881.

*William C. Schiller* was born in Stuttgart, Germany, and at the early age of one year was brought by his parents to Baltimore, Md., where he grew up, securing his preliminary education at Scheib's Zion School in Baltimore. At the age of 17, he entered the pharmacy of the late firm of Moore & Dieffenbach, soon after attending lectures at the Maryland College of Pharmacy, from which he graduated with first honors in 1874. After clerking for a number of years in Baltimore and Washington, D. C., he bought out an established pharmacy in South Baltimore, which he conducted until his death with the greatest zeal, his reward being a prosperous and remunerative business. Mr. Schiller was a refined gentleman and intelligent pharmacist, a devoted husband and kind father, and his memory will always be kept green by those who knew him best. He was married; a wife and two children survive him. In 1890, at the meeting held at Old Point Comfort, Va., he was elected a member of our Association.

*Walter A. Walling* was born in Providence, R. I., January 13th, 1848. He began to learn the drug business in the store of M. B. Smith, 308 North Main St., in 1864, and in 1868 went to New York city, and was under Prof. Chas. E. Seeley, studying chemistry, While in New York he entered Cooper Institute, and was there about two years. He then returned to Providence and re-entered the store of Mr. Smith, remaining one year. In October, 1871, he commenced business for himself on Chalkstone Avenue. In 1880, he bought the store of Mr. Smith where he formerly clerked, and continued running both stores up to the time of his death, which occurred October 26th, 1891. Deceased became a member of our Association in 1886, at the meeting held in Providence, R. I.

*H. Weichsel*, of Dallas, Texas, died there, aged 53 years. Deceased was a native of Germany. After having received a collegiate education, he commenced the study of pharmacy by entering a drug store in Brunswick. In 1863, Mr. Weichsel arrived in America. After clerking several years, in 1867 he went into business for himself in Cleveland, O., which he conducted successfully until 1884. Owing to bad health he removed to La Porte, Ind. Not finding the desired improvement there, he went to Dallas, Tex., about three years ago, where he resided up to the time of his death. He became a member of our Association at the meeting held in Kansas City in 1881.

*Geo. W. Woodbridge*, of Boston, died there of heart failure, June 13th, 1890, after a few days' sickness. Deceased conducted a drug store in Boston for many years with

success. He was beloved and respected by all who knew him. Mr. Woodbridge connected himself with our Association in 1859, at Boston, Mass.

*Charles Wright*, of New Orleans, died on the 22d of June, 1891, (five days after the death of his father, Wm. Wright), of typhoid malarial fever, aged 38 years. Had been 13 years in the business with his father, was a graduate of Pharmacy Class of 1879, Medical Department of the University of La. Deceased bore an excellent character, was possessed of pleasing manners, and was highly esteemed; leaves a wife, but no children. Mr. Wright became a member of our Association at the last meeting, held in the city of New Orleans in 1891.

*Wm. A. Wright*, of Memphis, Tenn., died at his father's residence, Bedford City, Va., December 30th, 1891. He graduated with distinction from the Maryland College of Pharmacy some years ago, and had been steadily rising in his profession ever since, until his untimely death. He entered upon his professional life at Columbus, Miss., whence he went to Memphis, Tenn., where his prospects were very bright. Mr. Wright was a noble young man of very striking character. He was of the very strictest integrity, and one of the most conscientious young men to be found. With a naturally amiable disposition, his gentlemanly and courteous bearing and many virtues won the love and esteem of all those with whom he came in contact wherever he has lived. Mr. Wright at the time of his death was but twenty-three years old. He was elected a member of our Association at the last meeting, held in New Orleans, 1891.

*Dr. Theophilus Redwood*, an honorary member of our Association, Emeritus Professor of Chemistry and Pharmacy to the Pharmaceutical Society of Great Britain, died March 5, 1892, at Boverton, Glamorganshire, South Wales, in the house where he was born, March 2, 1806. His early education was obtained from his father, who was a schoolmaster in the village named. After spending three years as apprentice to the drug business in Cardiff, he had the good fortune of securing, in 1823, an engagement with John Bell & Co., in London. Faithful in the discharge of all his duties, he was promoted from one position to another, and when Jacob Bell, who was four years younger than Redwood, became connected with the business, a warm attachment between the two was formed, and fostered by their common studies, ripened into friendship which was only severed by the death of Mr. Bell in 1859. In 1830 Mr. Redwood began business on his own account in Crawford street, London, and while building up the dispensing business manufactured some chemicals and pharmaceutical products, devoting especial attention to the perfection of the preparation of extracts in vacuo. When in 1841, through the energetic efforts of Jacob Bell and his associates, the Pharmaceutical Society of Great Britain was founded, the establishment of a school of Pharmacy was taken in hand, and the publication of the Pharmaceutical Journal commenced, Mr. Bell being the editor and proprietor, but at his death the copyright was transferred to the Pharmaceutical Society. Mr. Redwood acted as sub-editor from the commencement, until at Mr. Bell's death he became editor-in-chief until 1870, and remained a valued contributor to its pages until his retirement from active duties in 1886. Pharmaceutical meetings were inaugurated by the Society in May, 1841, and beginning with January, 1842, were held in the home acquired by the Society at 17 Bloomsbury Square. In the promotion of the objects of these meetings Prof. Redwood was indefatigable; his influence upon their scope and character is best judged from the minutes as published in the Pharmaceutical Journal, which show the vast amount of information that he could impart on all subjects pharmaceutical.

Professor Redwood's career as teacher commenced with the opening of the School at Bloomsbury Square in 1842, where he lectured on pharmacy until in 1845, Prof. Fownes, owing to ill health, was compelled to resign the chair of chemistry, when both branches were entrusted to Prof. Redwood, who had already been in charge of the laboratory, opened in 1844 and enlarged the year following, the first one in Great Britain for in-

struction in chemistry and pharmacy by practical operations in which the students were engaged throughout the day, under the guidance of a professor. To the Chemical Society he served as one of the Secretaries from 1852 to 1865, and then as Treasurer until 1870. He was also Secretary of the Cavendish Society from its foundation in 1864, and Honorary Secretary of a Committee of pharmacists appointed in 1854 to assist in remodelling the London Pharmacopœia. The first British Pharmacopœia published in 1864 not proving satisfactory, Professor Redwood prepared a new edition, which appeared in 1867, and the addenda in 1874. He was also the pharmaceutical editor of the last edition, published in 1885. When the British Pharmaceutical Conference was organized in 1864, he was made one of the Vice-Presidents, and for two years, 1876 and 1877, he was elected President. In 1869, he represented the Pharmaceutical Society at the International Pharmaceutical Congress held at Vienna, and in 1881 he was made President of the Fifth Congress which convened in London. In 1840, he prepared an English elaboration of F. Mohr's German work on pharmaceutical technics, which was subsequently re-published in Philadelphia, having been edited and adapted for American pharmacists by the late Prof. Wm. Procter. Gray's Supplement to the Pharmacopœia was revised and re-written by Prof. Redwood, and three editions were published in 1847, 1848, and 1857. He also edited several editions of Pereira's Selecta è Prescriptis, and for the abridged edition of 1872 of Pereira's Materia Medica he contributed the portion relating to chemistry and pharmacy. He was public analyst for the county of Middlesex, for the London districts of Holborn and St. Giles, and for the borough of Leeton, assisted in these duties by his son, D. H. Redwood, and by A. J. de Hailes. Prof. Redwood's life was one of well-directed labor, extending over a period of sixty-six years, dating from the commencement of his apprenticeship. That he was appreciated as a teacher was shown as early as 1850, when about one hundred of his pupils presented him with a costly service of plate as an expression of their gratitude, and later, in 1887, when a subscription was started for the foundation of a scholarship, which was consummated in 1888, and will hereafter be associated with the research laboratory of the Pharmaceutical Society of Great Britain. The value of his labors in science was recognized by the conferring upon him by the University of Giessen, of the degree of Ph.D., when Liebig in 1852 retired from that institution, to accept a chair in Munich. A number of Societies conferred honorary membership upon him; among others, this was done by our Association in 1871, and by the Philadelphia College of Pharmacy.

*George W. Sanford*, a distinguished British pharmacist, died May 16, 1892, at Cromer, in the same house in which he was born in 1813. It is said of him that since the death of Jacob Bell he had achieved more substantial good for pharmacists than any other member of the Pharmaceutical Society of Great Britain, of whose Council he was a member for twenty-four years, serving part of the time as Vice-President and as President. It was during his presidency, and largely due to his efforts, that the British Pharmacy Act of 1868 was passed. Deceased was elected an honorary member of our Association in 1882, at the meeting held at Niagara Falls, N. Y.

Before closing my report I herewith submit a list of names of members who are in arrears and liable to be dropped from the rolls if they fail to liquidate their indebtedness before the next volume of Proceedings is issued.

I desire at this time to return my sincere thanks to all members of the Association who rendered me valuable assistance by furnishing data for the obituaries. I would also request members to notify the Secretary of the Committee on Membership of the demise of members as early as practicable, as it is very difficult to obtain this information.

All of the above is respectfully submitted.

GEO. W. KENNEDY,
*Secretary of the Committee on Membership.*

On motion of Mr. Maisch the Council directed the applications for membership to be referred to a Committee of two for scrutiny. Messrs. Whelpley and Fennel having been appointed, attended to this duty, and subsequently reported having examined 290 applications and propositions, upon which they made a favorable report. On motion, the entire list was referred to the Association for action, with a favorable recommendation.

Mr. Thompson, Chairman of the Auditing Committee, made a verbal report on the books of the Permanent Secretary and Treasurer, and the bonds in the custody of the Chairman of the Council.

The account of the Permanent Secretary is endorsed as follows:

This account from March 15, 1891, to date, has been examined and found to be correct.

W. S. THOMPSON,
W. G. DUCKETT,
JNO. A. MILBURN,
*Auditing Committee.*

*Washington, June 10, 1892.*

The Auditing Committee's report attached to the Treasurer's books makes the following statement:

WASHINGTON, D. C., *June* 8, 1892.

The undersigned, a Committee appoined for the purpose by the Council, have examined the books and accounts of the Treasurer from March 15, 1891, to May 31, 1892, both dates inclusive, have compared the vouchers with the entries in the cash books and also the receipts and deposits, and find them all correct.

W. S. THOMPSON,
JNO. A. MILBURN,
W. G. DUCKETT.

The following report was read, and on motion of Mr. Eliel, accepted, the recommendation adopted, and referred to the Association:

## REPORT OF THE COMMITTEE ON PUBLICATION.

The Committee respectfully reports that, in accordance with instructions received at the last meeting, a pamphlet was issued containing the minutes of the New Orleans meeting, together with all the papers read, and that this pamphlet was mailed in August last to every member who, at that time, was not in arrears with his annual dues for two years or more. Only a number sufficient for this purpose was issued, and the pamphlet was not for sale. As far as heard from the members were pleased with receiving this duplicate copy of the minutes several months in advance of obtaining the bound Proceedings. The cost to the Association was somewhat less than twenty cents for each member. The Committee suggests that this plan of furnishing to the members each one printed copy, in pamphlet form, of the complete Minutes, as soon as can be done after the meeting, and in advance of the bound copy of the Proceedings, be continued in the future.

The thirty-ninth volume of Proceedings was distributed to those entitled early in January. It contains 930 printed pages, of which 138 pages make up the General Index for the volumes 1883–1890. The total cost of publishing, distribution and insurance on the property of the Association—exclusive of salaries, and not including account of the National Formulary—was as follows:

| | | | |
|---|---|---|---|
| Proceedings: | Stenographic report | $125 00 | |
| | Composition, paper and presswork | 1442 55 | |
| | Printing of Index | 485 20 | |
| | Reprints and queries | 33 00 | |
| | Binding and wrapping 1525 cloth, 100 paper | 394 25 | |
| | Expressage and postage for Proceedings | 350 38 | |
| | Proof reading of Index | 25 00 | |
| | | | $2855 38 |

| | | | |
|---|---|---|---|
| Minutes: | Paper, presswork and binding | $170 40 | |
| | Postage | 94 15 | |
| | | | $264 55 |
| Expenses of Sections: | Scientific Papers | 37 16 | |
| | Education and Legislation | 8 75 | |
| | Printing of Papers | 22 03 | |
| | | | 67 94 |
| Journals for use of Reporter for 1891 | | 17 10 | |
| " " " " 1892 | | 12 38 | |
| | | | 29 48 |
| Other expenses: | Wood cuts | 5 00 | |
| | Circulars and Stationery | 55 00 | |
| | Binding of old Proceedings | 26 00 | |
| | Packing boxes, expressage, etc. | 27 84 | |
| | Postage stamps | 54 00 | |
| | Premium for fire insurance | 15 00 | |
| | Circulars, postage, etc. (Internat. Phar. Congress) | 32 75 | |
| | | | 215 59 |
| Total | | | $3432 94 |

The manner in which the reduction of the price of the older volumes of Proceedings, and the large discounts for sets of these volumes, were brought to the notice of the members, has effected the disposal of a number of sets, varying from a few volumes to the entire series, to some members as well as to public institutions. These sales have reduced several of the older issues to such an extent that they are likely to be soon completely out of print. At present a few sets can still be supplied complete, with the exception of 1856, for which issue some members have offered and are willing to pay a considerable advance on the price at which it was formerly sold by the Association. Owing to the building operations now going on at the Philadelphia College of Pharmacy, where the books are stored, a correct account of stock could not well be taken at the present time; but will be furnished in time for publication in the new volume.

Attention is also called to the fact that there is still a steady demand for the National Formulary, proving the practical usefulness of this publication.

The insurance on the books, engravings, etc., belonging to the Association, is continued in the Hanover Fire Insurance Company of New York, for $3,000—at an annual premium of $15.

Respectfully submitted for the Committee on Publication,

A. CONRATH,
CHAS. T. P. FENNEL,
JOHN M. MAISCH.

The report of the Chairman of Council on invested funds, was read, accepted and referred to the Association.

ST. LOUIS, MO., *June* 4, 1892.

The invested funds in the hands of the Chairman of the Council consist of the following:

EBERT FUND.

| | |
|---|---|
| U. S. Registered 4 % Bond, $100.00, No. 160603 | $116 50 |
| " " 500.00, " 67880 | 582 50 |
| Cash, Savings Bank, Dover, N. H. | 62 55 |
| | $761 55 |

CENTENNIAL FUND.

| | |
|---|---|
| U. S. Registered 4 % Bond, $1000.00, No. 145640 | $1165 00 |
| " " 100.00, " 160604 | 116 50 |
| Cash, Savings Bank, Dover, N. H. | 188 99 |
| | $1470 49 |

June 10, 1892.—Examined and found correct.

W. S. THOMPSON,
JNO. A. MILBURN.

LIFE MEMBERSHIP FUND.

| | |
|---|---|
| U. S. Registered 4 % Bond, $100.00, No. 162830 | $116 50 |
| " " 1000.00, " 145639 | 1165 00 |
| " " 1000.00, " 145761 | 1165 00 |
| " " 1000.00, " 145762 | 1165 00 |
| " " 1000.00, " 150826 | 1165 00 |
| " " 1000.00, " 150827 | 1165 00 |
| " " 1000.00, " 150828 | 1165 00 |
| " " 1000.00, " 164185 | 1165 00 |
| " " 1000.00, " 164889 | 1165 00 |
| Cash, Savings Bank, Dover, N. H. | 772 47 |
| | $10208 97 |

GENERAL FUND.

| | |
|---|---|
| American Security and Trust Co., 5 % Debenture Bond, No. 26 | $1000 00 |
| " " " 27 | 1000 00 |
| " " " 28 | 1000 00 |
| | $3000 00 |
| Total invested funds | $15441 01 |

J. M. GOOD.

June 10, 1892.—Examined and found correct.

W. S. THOMPSON,
JNO. A. MILBURN.

The reports of the Treasurer and of the Permanent Secretary, each accompanied with a supplementary report for the month of June, were read, accepted, and referred to the Association.

## REPORT OF THE TREASURER OF THE AMERICAN PHARMACEUTICAL ASSOCIATION, JULY 1, 1891, TO JUNE 1, 1892.

RECEIPTS.

| | |
|---|---|
| Cash on hand July 1, 1891 | $6,670 33 |
| Received from the sale of 9 Certificates @ $5.00 | 45 00 |
| Received from the sale of 3 Certificates @ $7.50 | 22 50 |
| Received from the sale of 2 Duplicate Certificates @ $2.50 | 5 00 |
| Received from the sale of 1 Duplicate Certificate @ $3.75 | 3 75 |
| Received from the sale of Proceedings | 271 15 |
| Received from the sale of Badges | 61 10 |
| Received from the Estate of G. J. Luhn | 1 50 |
| Received for Interest on Deposit in New England Trust Company, Boston. | 83 02 |
| Received for Interest on Money Invested in Bonds | 75 00 |

| | | |
|---|---|---|
| Received for Life Membership Fees, viz.: | | |
| Albert R. Griffith | $40 00 | |
| Henry A. Fuller | 30 00 | |
| Mitchell G. Rosengarten | 40 00 | |
| | | 110 00 |
| Received for Annual Fees 1889 | 15 00 | |
| Received for Annual Fees 1890 | 55 00 | |
| Received for Annual Fees 1891 | 2,930 00 | |
| Received for Annual Fees 1892 | 1,810 00 | |
| Received for Annual Fees 1893 | 5 00 | |
| | | 4,815 00 |
| | | $12,163 35 |
| Received from sale of National Formulary | | 799 40 |
| | | $12,962 75 |

DISBURSEMENTS.

| | | | | |
|---|---|---|---|---|
| 1891. | | | | |
| July | 6. | Check No. 235. | Hans M. Wilder, Index of Proceedings | $25 00 |
| | 17. | Check No. 236. | H. R. Grassmann, National Formulary | 15 75 |
| | 20. | Check No. 237. | M. E. Diefenderfer, Sundry Expenses | 10 00 |
| | 30. | Check No. 238. | American Bank Note Company, Certificate. | 55 00 |
| | | Check No. 239. | Charles Rice, Salary 1891 to 1892 | 50 00 |
| August | 4. | Check No. 240. | Standard Publishing Company, Printing and Stationery | 19 75 |
| | 13. | Check No. 241. | Wickersham Printing Company, National Formulary | 17 30 |
| | | Check No. 242. | Wickersham Printing Company, Proceedings | 2 18 |
| | | Check No. 243. | Charles Rice, Salary 1891 to 1892 | 50 00 |
| September | 22. | Check No. 244. | John M. Maisch, Sundry Expenses | 12 15 |
| | | Check No. 245. | John M. Maisch, National Formulary | 3 94 |
| | | Check No. 246. | Wickersham Printing Company, Proceedings | 763 13 |
| | 29. | Check No. 247. | Bernard S. Dougherty, Proceedings | 26 00 |
| October | 1. | Check No. 248. | Charles Rice, salary 1891 to 1892 | 50 00 |
| | 10. | Check No. 249. | C. Lewis Diehl, ½ year's salary, 1890 to 1891 | 375 00 |
| | 20. | Check No. 250. | Winkley, Dresser & Co., printing and stationery | 25 50 |
| | 31. | Check No. 251. | John M. Maisch, sundry expenses. $18 80<br>National Formulary 6 05 | 24 85 |
| | | Check No. 252. | Wickersham Printing Company,<br>National Formulary $105 00<br>Proceedings 485 20 | 590 20 |
| | | Check No. 253. | Charles Rice, salary 1891 to 1892 | 40 00 |
| November | 16. | Check No. 254. | Hogan and Dingman, Section on Education and Legislation | 6 00 |
| | 17. | Check No. 255. | American Security and Trust Company Investment | 3021 62 |

| | | | | |
|---|---|---|---|---|
| November | 27. | Check No. 256. | H. R. Grassmann, printing and stationery. | $5 50 |
| | | Check No. 257. | Charles Rice, salary 1891 to 1892 | 40 00 |
| December | 9. | Check No. 258. | St. Louis Engraving Company, gold badges. | 339 50 |
| | 14. | Check No. 259. | Wickersham Printing Company, National Formulary | 15 13 |
| | 24. | Check No. 260. | St. Louis Engraving Company, gold badges. | 12 00 |
| | 26. | Check No. 261. | Charles Rice, salary 1891 to 1892 | 30 00 |
| | 31. | Check No. 262. | Willard H. Torbert, Section on Commercal Interests | 58 83 |
| | | Check No. 263. | Maurice W. Alexandeı, Section on Commercial Interests. | 29 00 |
| | | Check No. 264. | Arthur Bassett, Section on Commercial Interests | 37 46 |
| 1892. | | | | |
| January | 9. | Check No. 265. | H. R. Grassmann, printing and stationery. | 14 25 |
| | 18. | Check No. 266. | S. A. D. Sheppard, sundry items | 64 42 |
| | 26. | Check No. 267. | Charles Rice, salary 1891 to 1892 | 30 00 |
| February | 1. | Check No. 268. | Wickersham Printing Company, Proceedings | 1722 01 |
| | | Check No. 269. | John M. Maisch, sundry items | 42 38 |
| | 11. | Check No. 270. | Willard H. Torbert, Section on Commercial Interests | 90 00 |
| | 25. | Check No. 271. | Willard H. Torbert, Section on Commercial Interests | 1 98 |
| | | Check No. 272. | John M. Maisch, Journals for Reporter on Progress of Pharmacy | 17 10 |
| | | Check No. 273. | Winkley, Dresser & Co., printing and stationery | 4 10 |
| February | 25. | Check No. 274. | Wickersham Printing Company, account of National Formulary | $105 00 |
| | | Check No. 275. | Charles Rice, salary 1891 to 1892 | 30 00 |
| | | Check No. 276. | George W. Kennedy, half year's salary as Secretary of Council ........ $25 00 | |
| | | | Half year's salary as Sec. of Com. on Membership... 75 00 | |
| | | | | 100 00 |
| | | Check No. 277. | John M. Maisch, half year's salary | 375 00 |
| | | Check No. 278. | S. A. D. Sheppard, half year's salary | 300 00 |
| March | 18. | Check No. 279. | American Surety Company, premiums on Treasurer's bond | 30 00 |
| | 28. | Check No. 280. | Charles Rice, salary 1891 to 1892 | 30 00 |
| April | 5. | Check No. 281. | Henry Canning, Section on Commercial Interests | 47 60 |
| | 6. | Check No. 282. | Wickersham Printing Company, National Formulary ........ 12 37 | |
| | | | Proceedings ........ 2 41 | |
| | | | | 14 78 |
| | 14. | Check No. 283. | H. R. Grassmann, National Formulary ........ 2 00 | |
| | | | Printing and Stationery ........ 27 75 | |
| | | | | 29 75 |
| | 27. | Check No. 284. | Charles Rice, salary 1891 to 1892 | 40 00 |

| | | | | |
|---|---|---|---|---|
| May | 10. | Check No. 285. Standard Publishing Company, Printing for Transportation Committee | | $11 75 |
| | | Check No. 286. Hogan and Dingman, Section on Education and Legislation | | 9 00 |
| | 17. | Check No. 287. H. R. Grassmann, printing and stationery | | 24 50 |
| | | Check No. 288. John M. Maisch, sundry expenses | 41 05 | |
| | | National Formulary | 9 46 | |
| | | | | 50 51 |
| | 21. | Check No. 289. Winkley, Dresser & Co., printing and stationery | | 53 50 |
| | 28. | Check No. 290. Charles Rice, salary 1891 to 1892 | | 30 00 |
| 1891. | | | | |
| August | 18. | Life Membership Fund | | 40 00 |
| September | 1. | " " " | | 30 00 |
| 1892. | | | | |
| April | 21. | " " " | | 40 00 |
| | | Total | | $9128 42 |

SUMMARY OF DISBURSEMENTS.

July 1, 1891, to June 1, 1892.

| | |
|---|---|
| Salaries | $1570 00 |
| Premium on Treasurer's bond | 30 00 |
| Proceedings, see Checks 242, 246, 247, 252, 268, 282 | 3000 93 |
| General Index for Proceedings | 25 00 |
| Journals for Reporter on Progress of Pharmacy | 17 10 |
| Printing and Stationery | 174 85 |
| Section on Education and Legislation | 15 00 |
| Section on Commercial Interests | 264 87 |
| Transportation Committee | 11 75 |
| Certificates | 55 00 |
| Gold Badges | 351 50 |
| Miscellaneous Expenses | 188 80 |
| Total amount paid out for Current Expenses | $5704 80 |
| National Formulary | 292 00 |
| Life Membership Fund | 110 00 |
| Invested | 3021 62 |
| | $3423 62 |
| Total amount of Disbursements | $9128 42 |
| Cash on hand June 1st, 1892 | 3834 33 |
| | $12962 75 |

June, 1892.—Examined and found correct.

W. S. THOMPSON,
JNO. A. MILBURN,
W. G. DUCKETT.
*Auditing Committee.*

## SUPPLEMENTARY REPORT OF THE TREASURER OF THE AMERICAN PHARMACEUTICAL ASSOCIATION, JUNE 1, 1892, TO JULY 1, 1892.

### RECEIPTS.

| | | |
|---|---|---|
| Cash on hand June 1, 1892 | | $3,834 33 |
| Received from sale of Proceedings | | 4 40 |
| Received from sale of Badges | | 2 00 |
| Received for Interest on Deposit in New England Trust Company, Boston | | 41 95 |
| Received for Annual Fees 1890 | $5 00 | |
| Received for Annual Fees 1891 | 5 00 | |
| Received for Annual Fees 1892 | 710 00 | |
| Received for Annual Fees 1893 | 10 00 | |
| | | 730 00 |
| Received from sale of National Formulary | | 37 04 |
| | | $4,649 72 |

### DISBURSEMENTS.

| 1892. | | | | |
|---|---|---|---|---|
| June | 14. | Check No. 291. C. Lewis Diehl, Sundry Expenses | | $15 07 |
| | 27. | Check No. 292. Geo. W. Kennedy, ½ year's Salary 1891 to 1892, as Secretary of Council | $25 00 | |
| | | ½ year's Salary, 1891 to 1892, as Secretary Committee on Membership | 75 00 | |
| | | | | 100 00 |
| | 27. | Check No. 293. John M. Maisch, ½ year's Salary, 1891 to 1892 | | 375 00 |
| | | Check No. 294. S. A. D. Sheppard, ½ year's Salary, 1891 to 1892 | | 300 00 |
| | | Check No. 295. Charles Rice, Salary, 1891 to 1892 | | 50 00 |
| | | Check No. 296. Geo. W. Kennedy. Printing and Stationery. | | 34 90 |
| | | Check No. 297. Standard Publishing Co., Printing and Stationery | | 30 50 |
| | 30. | Check No. 298. Committee on Transportation, Special Deposit with Agent of Railroads | | 41 00 |
| July | 1. | Cash on hand | | 3,703 25 |
| | | | | $4,649 72 |

### SUMMARY OF DISBURSEMENTS, JULY 1, 1891, TO JULY 1, 1892.

| | |
|---|---|
| Salaries | $2,395 00 |
| Premium on Treasurer's Bond | 30 00 |
| Proceedings, see Checks Nos. 242, 246, 247, 252, 268, 282 | 3,000 93 |
| General Index for Proceedings | 25 00 |
| Journals for Reporter on Progress of Pharmacy | 17 10 |
| Printing and Stationery | 240 25 |
| Section on Education and Legislation | 15 00 |
| Section on Commercial Interests | 264 87 |
| Transportation Committee | 52 75 |
| Certificates | 55 00 |
| Gold Badges | 351 50 |
| Miscellaneous Expenses | 203 87 |

| | |
|---|---|
| National Formulary | $292 00 |
| Life Membership Fund | 110 00 |
| Invested | 3,021 62 |
| | $10,074 89 |
| Cash on hand July 1, 1892 | 3,703 25 |
| | $13,778 14 |

Of the cash in the Treasury the sum of $285.39 belongs to the account of the Committee on Arrangements, as per following statement:

ACCOUNT OF COMMITTEE ON ARRANGEMENTS.

| | | |
|---|---|---|
| 1891. | | Dr. |
| July 1. | Cash on hand | $278 43 |
| 1892. | | |
| July 1. | Interest to date | 6 96 |
| | | $285 39 |

PROSPECTIVE ASSETS.

Not counting what is due from members whose names will probably be dropped from the roll at the next annual meeting, there is now outstanding on the books of the Association:

| | |
|---|---|
| Annual Dues for 1890 | $15 00 |
| " " " 1891 | 235 00 |
| " " " 1892 | 3415 00 |
| | $3665 00 |

Thanking the officers and members for their uniform courtesy during the year, this report is respectfully submitted,

S. A. D. Sheppard,
*Treasurer.*

SUMMARY OF COST AND RECEIPTS FROM SALES OF NATIONAL FORMULARY, FROM JULY 1, 1891, TO MAY 30, 1892.

I. EXPENSES.

| | |
|---|---|
| Printing and binding 1000 copies | $210 00 |
| Circulars, expressage, postage, etc. | 82 00 |
| Total expenses | $292 00 |

II. RECEIPTS.

| | |
|---|---|
| From 17 dealers, not agents | $629 33 |
| From office sales | 170 07 |
| Total receipts | $799 40 |

III. REMITTANCES.

| | |
|---|---|
| To Treasurer, as per Treasurer's receipts | $799 40 |

IV. BILLS RECEIVABLE.

| | |
|---|---|
| From 14 dealers, not agents | $97 39 |

V. BILLS PAYABLE.

All bills rendered to date have been paid.

VI. COPIES DELIVERED GRATUITOUSLY.

| | |
|---|---|
| To Revision Committee, according to Resolution of Council, June, 1891—22 copies, sheep interleaved; 15 copies, cloth interleaved; value at wholesale price | $29 34 |
| Previously reported, Proceedings 1889, p. 16—1378 copies, value at wholesale price | 708 70 |
| Previously reported, Proceedings 1890, p. 25—6 copies, value at wholesale price | 3 00 |
| Total number, 1421 copies, value at wholesale price | $741 04 |

VII. STOCK ON HAND.

| | |
|---|---|
| Copies in cloth | 162 |
| Copies in cloth, interleaved | 58 |
| Copies in cloth, raised nails | 12 |
| Copies in sheep | 58 |
| Total copies on hand | 290 |

VIII. RECAPITULATION OF TOTAL RECEIPTS AND EXPENSES.

| | | |
|---|---|---|
| Remittances to Treasurer to June 30, 1891 (see Proceedings 1891, page 237) | $6393 43 | |
| Remittances from July 1, 1891, to May 30, 1892 (see above) | 799 40 | |
| Total cash receipts from National Formulary | | $7192 83 |
| Cash payments to June 30, 1891 (see Proceedings 1891, p. 238). | $4240 12 | |
| Cash payments from July 1, 1891, to May 30, 1892 | 292 00 | |
| Total cash payments for National Formulary | | 4532 12 |
| Total cash profit to May 30, 1892 | | $2660 71 |

SALES OF PROCEEDINGS.

| | |
|---|---|
| From July 1, 1891, to May 30, 1892, 16 sets (varying from 1 to 39 volumes) as per ledger account, page 142 | $271 15 |

This amount has been remitted to the Treasurer.

ACCOUNT OF BADGES.

| | | |
|---|---|---|
| Gold badges received from Chairman of Council | 45 | |
| Gold badges sold to May 30, 1892, at $2.00 | 30 | $60 00 |
| Sale of old badges, and extra remittances | | 1 10 |
| Total amount remitted to Treasurer for badges | | $61 10 |
| Gold badges on hand May 30, 1892 | 15 | |

JOHN M. MAISCH,
*Permanent Secretary.*

PHILADELPHIA, *May 30, 1892.*

SUPPLEMENTARY REPORT OF REMITTANCES TO THE TREASURER FROM MAY 30 TO JUNE 30, 1892.

| | |
|---|---|
| For account of National Formulary.................................... | $37 04 |
| For account of Proceedings.............................................. | 4 40 |
| For account of Badges...................................................... | 2 00 |

JOHN M. MAISCH,
*Permanent Secretary.*

The Treasurer presented a list of names of members who are in arrears and liable to be dropped from the roll. Action was deferred to another session.

On motion of Mr. Torbert the form of blank application was referred to Messrs. Maisch and Kennedy, with the view of improving the same.

On motion of Mr. Eliel the hour for holding the first session of the Association was fixed for 10 o'clock on the following morning.

The list of credentials of delegates appointed to the present meeting was presented by the Permanent Secretary, and on motion of Mr. Thompson referred to a committee of one for examination, with the instruction to report directly to the Association. Mr. Maisch was appointed the Committee.

The Permanent Secretary presented a communication from a Committee of the Michigan State Pharmaceutical Association in reference to the cutting of prices on proprietary articles; also one from the Secretary of the Colorado State Pharmacal Association on the subject of the U. S. special liquor tax. Both communications were, on motion, referred to the Committee on Commercial Interests.

A discussion took place on the advisability of the adoption of the amendment to the Constitution, lying over from the preceding year, which contemplates changing in Article IV the words "shall be used" to "may be used." On motion of Mr. Torbert it was then resolved that the Council recommend to the Association that no change be made in Article IV of the Constitution, which refers to the use of the interest of the life membership fund.

A letter from Prof. Diehl had been received in acknowledgment of testimonial voted him last year (see Proceedings 1891, p. 28):

LOUISVILLE, KY., *August* 3, 1891.

Prof. CHAS. T. P. FENNEL, *Cincinnati, Ohio.*

*Dear Sir:* I am in receipt of the testimonial tendered me by the American Pharmaceutical Association upon my retirement as Reporter on the Progress of Pharmacy, "in recognition" as kindly stated "of my past services to the Association." I cannot find words to express how gratefully I appreciate the high compliment conveyed to me in this testimonial, and beg that you will transmit to the Committee, and through it to the Association, my profound thanks.

I take occasion, also, to say that while my resignation of the office of Reporter on the Progress of Pharmacy was determined by the condition of my health, this condition is not so serious as to prevent me from doing useful work in the Association, and I sincerely believe and hope that in the future, as in the past, the Association can count upon me to be one of its working members.

Very sincerely yours, etc.,
C. LEWIS DIEHL.

The Chair appointed the following committee on time and place of the next annual meeting, to report at the next session:

S. A. D. Sheppard, T. F. Main, J. P. Remington, G. W. Sloan and A. E. Ebert.

Mr. Whelpley gave written notice of an amendment to Article IV, Chap-

ter IV of the By-laws, by substituting $750 for $600, in relation to the treasurer's salary; the proposed amendment was seconded by Mr. Good.

The Association then adjourned until 4 p. m.

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SECOND SESSION.—THURSDAY AFTERNOON, JULY 14th.

President Finlay called the meeting to order at 4 : 30 p. m. The minutes of the first session were read by the Permanent Secretary, and on motion approved.

Mr. Whelpley on behalf of the Nominating Committee read the following report:

JULY 14, 1892.

The Nominating Committee respectfully submit the following names:

*President.*—Prof. J. P. Remington, Philadelphia.

*First Vice-President.*—A. P. Preston, Portsmouth, N. H.

*Second Vice-President.*—S. P. Watson, Atlanta, Ga.

*Third Vice-President.*—W. H. Averill, Frankfort, Ky.

*Treasurer.*—S. A. D. Sheppard, Boston.

*Permanent Secretary.*—J. M. Maisch, Philadelphia.

*Reporter on Progress of Pharmacy.*—Henry Kraemer, New York.

*Council.*—H. M. Whitney, Lawrence, Mass.; G. Ramsperger, New York; Chas. E. Dohme, Baltimore, Md.

W. H. TORBERT, *Chairman.* H. M. WHELPLEY, *Secretary.*

On motion of Mr. Main, the report was accepted and a ballot was ordered to be taken for the nominee for the office of President for the ensuing year.

The chair appointed Messrs. Ebert and Kline tellers, who after the ballot had been deposited, reported the unanimous election of Joseph P. Remington as President. While balloting was going on the following remarks were made:

MR. WHELPLEY: I wish to say a word of explanation in behalf of the Committee on Nominations. The name of Mr. Henry Kraemer, who has been selected for the office of Reporter on the Progress of Pharmacy is, no doubt, unfamiliar to most of the members. The Nominating Committee, however, was informed that Dr. Rice, who has served during the past year as Reporter on the Progress of Pharmacy, had positively declined to continue the work hereafter,* and it was upon his recommendation that Mr. Kraemer's

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* The following letter was received after the close of the second session:

NEW YORK, *June* 13, 1892.

Prof. JOHN M. MAISCH, *Permanent Secretary of the American Pharmaceutical Association:*

DEAR SIR: It is probably understood that I am not a candidate for the office of Reporter on the Progress of Pharmacy, after the expiration of my year's term, not because the work is not agreeable or congenial to me, but because I cannot give it the personal attention which it ought to receive. Should there be any doubts, however, as to my position, I beg that you will announce, on my behalf, that I shall not accept the office again.

I trust that the selection will fall on some one who will be able to devote his own time and energy to it, and who is likely to retain it for a number of years, for the work requires experience which can only be gained by remaining in the harness.

Very truly yours, CHARLES RICE.

name was presented to the Association. I think that this explanation is in order at this time, for I believe all of you will be of the opinion that any one whom Dr. Rice would recommend is a desirable person for the position.

On motion of Mr. Main, the Secretary was instructed to cast an affirmative ballot for the remaining nominees, which having been done, they were declared duly elected to their respective offices.

The Secretary read a letter from Mr. Geo. C. Frye, of Portland, Me., addressed to the Local Secretary, Mr. Whitney, cordially inviting the members present at the meeting to visit that city, tendering from the Portland Board of Trade a drive about the city; from the druggists an informal reception at the Falmouth House, a sail among the Islands of Casco Bay, a mammoth clam bake at Long Island, etc.

MR. SHEPPARD: Just at this time, I would like to say a word in regard to our Local Secretary, for he is a modest man, who would not say it for himself. It is in relation to these receptions. Our Local Secretary, when appointed, declined at first, but we urged him very strongly to accept. After he had accepted, he began to think it over, and he came to some of his friends in Boston, and made this statement; that if he were going to serve as Local Secretary, he wanted the Association to be received by New England, or at least that part of it that surrounds the White Mountains; that he wanted Massachusetts, Maine, New Hampshire and Vermont, each, to participate in the invitation and give a reception to our Association. And it is entirely due, gentlemen, to the zeal and earnestness of our Local Secretary that pharmacists in these different places have come forward so generously with their hospitality. They have been stimulated by his zeal and enthusiasm to do work which otherwise would very likely have been left undone, and I think we shall always owe to our Local Secretary a debt in this way which we never can pay. (Applause.)

MR. KENNEDY: I now move that the applicants for membership whose names were read this morning be invited to join the Association. The objection raised by a member to the admission of one of these parties has been withdrawn, he having discovered that his impression as to the undesirability of the applicant was erroneous.

Mr. Kennedy's motion was seconded, and the candidates presented at the first session were elected.

The following reports were read as part of the minutes of the Council read at the first session:

By Mr. Sheppard: Report of the Treasurer (see page 27).

By Secretary Maisch: Report on cost and receipts from sales of the National Formulary (see page 32).

By Mr. Kennedy: Report of the Committee on Membership (see page 15).

By Secretary Maisch: Report of the Committee on Publication (see page 25).

By Mr. Good: Report of the Chairman of Council on invested funds (see page 26).

These reports were ordered to take the usual course.

The report on the Progress of Pharmacy was known to be in course of

preparation, but could not be finished at the date of the meeting. After adjourning this session, the following letter was received and laid before the Council (see page 50):

NEW YORK, *July* 13, 1892.

PROFESSOR JOHN M. MAISCH, *Permanent Secretary, American Pharmaceutical Association:*

*Dear Sir:* I had anticipated much pleasure from attending this year's meeting of our Association, as it would have given me an opportunity of again meeting yourself and my other friends and fellow-members. Up to within a few days ago, I was still in hopes of being able to attend, even if it were only a few days, but my medical adviser insists upon my staying at home for the present, until I have got over the sequelæ of a cold contracted some four weeks ago, which I have every reason to hope will only take a short time. I beg you, therefore, to make my excuses to the Association, and to convey to the members my best wishes for a pleasant and profitable meeting.

Last year at the New Orleans meeting, the Association thought fit to elect me, though personally absent, as Reporter on the Progress of Pharmacy. Since a declination of the honor, subsequent to the meeting, would perhaps have embarrassed the Council, I accepted the office under the condition that I should be authorized to have the necessary compilations made by persons to be employed by me, and who should be paid for their work out of the salary of the Reporter. This condition was readily agreed to by the Council, and accordingly I engaged the services of Mr. Hans M. Wilder, of Philadelphia, and Mr. Henry Kraemer, of New York, to make the necessary abstracts and compilations. Since the Report on the Progress of Pharmacy is to comprise the literature up to June 30th of each year, it was not possible to lay the finished Report before this meeting. But I can state that the compilation is practically finished, and needs only to be finally arranged by me to be made ready for the printer. It will be placed into your hands whenever you call for it.

With best wishes for the success of the meeting and the continued prosperity of the Association, I remain,

Very truly yours,

CHARLES RICE.

*Reporter on the Progress of Pharmacy for the year 1891–'92.*

Mr. Oldberg read the following:

## REPORT OF THE SPECIAL COMMITTEE ON THE SEVENTH INTERNATIONAL PHARMACEUTICAL CONGRESS.

This Committee was appointed for the purpose of co-operating "in the work of preparing for an International Pharmaceutical Congress." The manner in which the Committee was appointed clearly indicates that it was the intention of the American Pharmaceutical Association to co-operate with the World's Congress Auxiliary of the World's Columbian Exposition in the preparations made by the Auxiliary for the holding of a World's Congress of Pharmacists, but it explicitly names the International Pharmaceutical Congress, and the President and Permanent Secretary of the American Pharmaceutical Association, as well as all the other members of the Committee, have, therefore, held that this Committee is a Committee on the Seventh International Pharmaceutical Congress, and as such it has performed such duties as it seemed necessary should be performed without delay.

Inasmuch as the President and Permanent Secretary of this Association had already, prior to the New Orleans meeting, officially corresponded with the Committees at Brussels and Milan, charged with the duty of convening the Seventh International Pharma-

ceutical Congress, the Chairman of this Committee requested the Permanent Secretary to continue said correspondence until a definite conclusion might be reached. President A. K. Finlay and Permanent Secretary John M. Maisch announced last September that the American Pharmaceutical Association had appointed this Committee "for perfecting the arrangements for the contemplated Pharmaceutical Congress at Chicago." The correspondence, being continued, finally led to the desired result; the Italian Committee ceded its powers to the American Pharmaceutical Association. This Committee was not informed, however, of this result until in April, when the Chairman visited Philadelphia for the purpose of conferring with the Permanent Secretary of this Association, who is an ex-officio member of this Committee.

This Committee then issued a preliminary announcement, of which a copy is submitted with this report. This announcement has been sent to all the Pharmaceutical Societies, the State Boards of Pharmacy, the Pharmaceutical Colleges, and to a large number of prominent pharmacists, and has also been sent to the pharmaceutical journals.

In view of the nearness of the meeting of the American Pharmaceutical Association, no further action was taken, as it was deemed impracticable to accomplish any definite results until the date of the meeting of the Congress shall have been fixed by the American Pharmaceutical Association, and certain other questions determined.

This Committee submits for the approval of the Association the following recommendations:

1. That the Pharmaceutical Societies, Examining Boards and Colleges and Pharmacopœial Committees or Commissions, be each invited to send five delegates to the Seventh International Pharmaceutical Congress.

2. That special invitations be also sent to prominent teachers, authors and leaders of the pharmaceutical profession, to be present.

3. That in order to defray the expenses attendant upon the Congress, the American members be each required to pay the sum of five dollars, their admission as members to be conditioned upon their consent to this assessment, and that no assessment be made upon members and visitors from other lands.

4. That the date for holding the Seventh International Pharmaceutical Congress be fixed by the American Pharmaceutical Association at this meeting.

5. That the proceedings of the Seventh International Pharmaceutical Congress be in the English language, and that three interpreters and translators be employed to act as interpreters at the sittings and to translate letters, papers and proceedings into German, French and Spanish, respectively, and that the proceedings be published in English, German, French and Spanish. The advisability of including one other language might be left to be decided by the enlarged Committee when it shall have become known what the probable attendance will be.

6. That this Committee of the American Pharmaceutical Association be enlarged by the appointment of at least five additional members, not residents of Chicago, to cooperate with the Chicago members, and this Committee respectfully suggests that the Council be directed to select and appoint said additional members. The Committee would then consist of the six Chicago members already appointed, together with the President and Permanent Secretary of the Association ex-officio, and additional members herein referred to. This enlargement of the Committee is deemed necessary in view of the importance of the work to be done, and in order that the Committee may adequately represent the pharmacists of America, and it is further rendered necessary by reason of the probability that the routine correspondence and local arrangements, which must fall upon the local members, will demand all the time and attention which the Chicago members ought to be expected to give.

7. As all papers and recommendations to be read before the Congress ought to be

printed in advance of the meeting, it is further recommended that the appropriation of one thousand dollars out of the treasury of the American Pharmaceutical Association be placed at the disposal of the Committee, to be expended in defraying the necessary expenses involved, subject to the approval of the Council.

8. It is also recommended that, in all matters upon which the American Pharmaceutical Association may not at this meeting adopt specific rules or instructions, the enlarged Committee on the Seventh International Pharmaceutical Congress be given authority to act according to its best judgment, observing as far as practicable the precedents established by previous International Pharmaceutical Congresses.

This Committee takes pleasure in acknowledging the courtesies extended to it by the President of the World's Congress Auxiliary of the World's Columbian Exposition, to whom the thanks of the Association are due for placing at the disposal of the Seventh International Pharmaceutical Congress a suitable hall in the World's Congress building, and for other courtesies.

Respectfully submitted, OSCAR OLDBERG, *Chairman.*

ALBERT E. EBERT, *Secretary of Committee.*

## AMERICAN PHARMACEUTICAL ASSOCIATION, COMMITTEE ON THE SEVENTH INTERNATIONAL PHARMACEUTICAL CONGRESS.

CHICAGO, *May* 26TH, 1892.

*To all Pharmaceutical Societies and Other Organized Bodies of Pharmacists of All Countries:*

The American Pharmaceutical Association has invited the Seventh International Pharmaceutical Congress to meet in the city of Chicago during the season of the World's Columbian Exposition, in 1893: the assent of the Executive Committee of the Sixth Congress at Brussels and of its Committee on Organization at Milan has been formally given, and the American Pharmaceutical Association has appointed a special committee to arrange the preliminaries.

This Committee on the Seventh International Pharmaceutical Congress consists of: Oscar Oldberg, Chairman; Albert E. Ebert, Secretary; E. H. Sargent, D. R. Dyche, L. C. Hogan, and C. S. Hallberg, all of Chicago; together with the President and the Permanent Secretary of the American Pharmaceutical Association, *ex officio.*

In the performance of its function, this Committee has the honor, therefore, to invite all Pharmaceutical Societies and other organized bodies of Pharmacists of all countries to appoint delegates to the Seventh International Pharmaceutical Congress, to be held in Chicago in 1893; and an invitation is also extended to all Teachers in Pharmaceutical Schools and Members of Pharmacopœial Commissions to participate in the Congress.

The precedents established by previous International Pharmaceutical Congresses will be followed in regard to all preliminaries as far as practicable.

The Seventh International Pharmaceutical Congress will hold its sessions in the World's Congress building of the World's Columbian Exposition. The date of its meeting will be announced after it shall have been fixed by the American Pharmaceutical Association at its annual meeting in July of this year.

Letters of information or inquiry should be addressed to the Chairman of this Committee.

On behalf of the American Pharmaceutical Association, all who will honor the occasion by their presence are assured of a most hearty welcome.

By the Committee:

OSCAR OLDBERG, *Chairman.*

ALBERT E. EBERT, *Secretary.*

*An Sæmmtliche Pharmaceutische Gesellshaften und an alle anderen Organisirten Kærperschaften der Apotheker aller Lænder:*

Die "American Pharmaceutical Association" hat den Siebenten Internationalen Pharmaceutischen Congress eingeladen, in Chicago waehrend der Columbus-Weltausstellung 1893 zu tagen; und haben das Executiv-Comite des Sechsten Congresses zu Bruessel, sowie das Organisations-Comite desselben in Mailand formell ihr Einverstaendniss hierzu erklaert. Fuer die diesbezueglichen Vorbereitungen hat die "American Pharmaceutical Association" ein Special Comite ernannt.

Dieses Comite fuer den Siebenten Internationalen Pharmaceutischen Congress besteht aus folgenden Mitgliedern:

Oscar Oldberg, Vorsitzender; Albert E. Ebert, Secretair; E. H. Sargent, D. R. Dyche, L. C. Hogan, C. S. Hallberg, alle wohnhaft in Chicago; auserdem gehoeren dazu, ex-officio, der Praesident und der Secretair der "American Pharmaceutical Association."

In Ausfuehrung dieser Aufgabe beehrt sich dieses Comite hiermit saemmtliche Pharmaceutische Gesellschaften und Vereine aufzufordern, Delegaten zum Siebenten Internationalen Pharmaceutischen Congress in Chicago 1893 zu ernennen—und richtet gleichzeitig auch die Aufforderung an saemmtliche Lehrer Pharmaceutischer Schulen, und die Mitglieder der Pharmakopoe-Commissionen, und Pharmaceuten im allgemeinen, sich zahlreich zu betheiligen.

Soweit als thunlich werden die in frueheren Congressen beobachteten Regeln auch fuer diesen Congress beibehalten werden.

Der Siebente Internationale Pharmaceutische Congress wird seine Sitzungen in der Welt-Congress-Halle der Columbus-Weltausstellung halten. Der Tag der Zusammenkunft wird angekuendigt werden, sobald die "American Pharmaceutical Association" in ihrer jaehrlichen Sitzung im naechsten Juli denselben festgestellt haben wird.

Gefaellige Anfragen bitten wir an den Vorsitzenden dieses Comites zu richten.

Im Namen der "American Pharmaceutical Association" versichern wir alle denen, welche persoenlich an dem Congresse theilnehmen werden, die herzlichste Aufnahme.

Im Auftrage des Comites

OSCAR OLDBERG, *Vorsitzender.*

ALBERT E. EBERT, *Secretair.*

*Aux Sociétés Pharmaceutiques et aux Associations des Pharmaciens de Tous Les Pays:*

L'American Pharmaceutical Association a invité Le Septième Congrès International de Pharmacie à venir siégér à Chicago à l'occasion de l'Exposition Universelle qui doit avoir lieu dans cette ville en 1893, et le Comité Exécutif du Sixième Congrès tenu à Bruxelles, ainsi que son Comité d'Organisation de Milan ayant donné à cette invitation leur assentiment formel, l'American Pharmaceutical Association vient de nommer un Comité Spécial chargé de régler tous les préliminaires.

Ce Comité d'Organisation du Septième Congrès Pharmaceutique International se compose de MM. Oscar Oldberg, Président, Albert E. Ebert, Secrétaire, E. H. Sargent, D. R. Dyche, L. C. Hogan et C. S. Hallberg, tous de Chicago, et du President et du Secrétaire Perpétuel de l'American Pharmaceutical Association membres *ex-officio.*

En conséquence, le Comité a l'honneur d'inviter les Sociétés Pharmaceutiques et toutes les Associations se rattachent à la Pharmacie à nommer des délégués en vue du Septième Congrès International de Pharmacie, qui doit avoir lieu à Chicago en 1893; semblable invitation est faite également aux Professeurs des Ecoles de Pharmacie, aux membres des Commissions Pharmaceutiques et à tous les Pharmaciens en général.

Dans l'établissement de ces préliminaires l'on se comformera, dans la mesure du possible aux précédents etablis lors les Congrès anterieurs.

Le Septième Congrès International de Pharmacie se tiendra dans le Palais de l'Exposition réservé aux Congrès Internationaux et l'on en fera connaître la date aussitôt que l'American Pharmaceutical Association aura statuée à cet égard, dans son assemblée annuelle au mois de Juillet prochain.

Toutes les lettres et demandes d'informations devront être addressés au président de ce Comité.

Nous avons l'honneur de souhaiter, au nom de l'American Pharmaceutical Association, une cordiale bienvenue à tous ceux qui voudront bien prendre part à ce Congrès.

Pour le Comité: OSCAR OLDBERG,
*Le Président.*

ALBERT E. EBERT, *Le Secrétaire.*

MR. OLDBERG: In submitting this report, I desire to say further that the correspondence which the Committee has thus far had shows plainly that it is extremely difficult, if not impossible, to make additional progress until the date for holding this Congress shall have been fixed. Almost the first question that every correspondent asks is, "When will the Congress meet? Whether we can come or not depends upon the date of the meeting." Another point upon which action should be taken is this: the duties of the Committee do not seem to be well understood or defined. The Committee, therefore, requests that the Council, if it is the pleasure of the Association to so order, shall define the duties of this Committee, so that the work may be carried out smoothly and without conflict.

Mr. Dadd moved the acceptance of the report, and that the suggestions made by the Committee be referred to the Council for action. Mr. Hallberg seconded the motion, and it was duly carried.

The report of the committee appointed to visit the National Wholesale Druggists' Association being called, it was, on motion, without being read, referred to the Section on Commercial Interests.

Mr. Diehl read the report of the Committee on the National Formulary, which, on motion, was received and referred for publication.*

At the request of the delegation to the American Medical Association, the reading of its report was deferred until the last session.

Mr. Sheppard, on behalf of the Committee on Time and Place of Next Meeting, presented the following report:

The Committee on Time and Place of Meeting would respectfully report, recommending that the next annual meeting of the Association be held in Chicago, Illinois, at such time as shall be selected by the Council.

On motion of Mr. Hallberg, the report was received, and its recommendation adopted.

The amendment to the Constitution, proposed in 1891, was called up for action, changing in the last line of Article IV. the word *shall* to *may*, thus making the Article read:

* Owing to the length of this report, it was deemed best to print it at the close of the Minutes of the general sessions, preceding the Minutes of the Section on Commercial Interests.—PERMANENT SECRETARY.

"All moneys received from life membership, together with such funds as may be bequeathed, or otherwise donated to the Association, shall be invested by the Treasurer in United States Government or State securities, the annual interest of which only *may* be used by the Association for its current expenses."

Mr. Kennedy then read the resolution of the Council, recommending that no change be made in Article IV. of the Constitution, which refers to the use of the interest of the life membership fund.

MR. ELIEL: In the name of those who did not attend the New Orleans meeting, I would like to ask what the reasons were that caused this amendment to be proposed, and why it is the Council wishes it to be voted down?

SECRETARY MAISCH: The clause as it now stands, was originally adopted in 1870. In 1891, Mr. Hurty offered this amendment at the suggestion of ex-President Taylor, who recommended it in his address. As it now reads, the article requires that the money constituting the life membership fund shall be placed at interest, and that the interest shall go into the general fund to be used with the annual dues for ordinary expenses. Regarding the substitution of the word "may," the idea of ex-President Taylor was, I believe, that this fund should be allowed to accumulate by compound interest, and the Association should draw upon it only in case of necessity. The Council, after discussion last evening, decided that the former course should be continued, that is, that the interest should be placed annually at the disposal of the treasury for current expenses.

MR. OLDBERG: I believe that the majority of members present will agree with me, that the clause, either as it now stands, or with the proposed amendment, amounts to precisely the same thing. I am unable to see that the word "may" gives a different meaning to that conveyed by the word "shall."

MR. EBERT: I hope that the amendment will be passed for this reason; I can see no reason why the money should be expended if it is not necessary. This Association has money enough in its treasury to meet the annual expenses, and the suggestion of Ex-President Taylor regarding the accumulated money is a very good one. There may be a time when we shall need money, and at that time we can very easily turn that interest into the funds of the Association. There have been times when we needed money very badly, and it seems to me we might just as well be economizing now, so as to make a good large fund, instead of spending it as we would if we had it in the general treasury. I think the suggestion is a very good one, and I hope that the Council will use its discretion in turning it either one way or the other, and not have them directed to spend it.

MR. TORBERT: If I understand the situation correctly, what Mr. Ebert desires is the condition that obtains. The thought of the Council was this, that there should be no disparity between the life membership and the members of this Association. The contributing members pay their dues annually into this Association, which go directly for the expenses of the Association. The Council considered that money received from life membership ought to remain in the permanent fund, but that the interest of that should go to the general fund, and in that way put the life members on a footing with us, and not have his money go in a different direction from ours. Of course, it has stood in this way since 1870, I believe Mr. Maisch said, and there never has been any profligate use of the funds of the Association. It will never happen that men will be elected to the offices of this Association who would be likely to expend its funds in that way. It seems to me that the judgment of the Council should have some weight with this body, and I think the reasons on which they based that judgment should be respected, namely, that the life membership and the ordinary membership should be on an absolute parity.

MR. EBERT: That is exactly how I would like to see the matter arranged—to have it understood that the Council may, if necessary, use the fund, and if it does not need it, they shall not use it, but allow it to accumulate. It is discretionary with the Council.

MR. REMINGTON: I believe Mr. Ebert is right about this. In view of the fact that we are getting a large number of new members and are likely to get a great many more, I think that this interest will not be required. I do not think that the interest on money from the life membership fund ought to be used up first, according to the terms of the Constitution, for as I understand that article, you must use this money for current expenses. I would rather see it remain, for the Association is in an excellent financial condition at the present time. If there is no occasion to use the interest, I believe we should feel much stronger financially if we knew it was there to be drawn on when actually required. As the article now reads, it seems to me, its employment is mandatory.

MR. SEABURY; In my opinion, the position taken by the Permanent Secretary should be supported, namely, that this interest shall be placed in the general fund. In every organization throughout the land where they have established such a fund, they have done precisely the same thing. I would like to ask the question, "What difference does it make whether that interest remains in the life-membership fund or whether it is put into the general treasury?" Will any one tell me where the difference lies? A discussion of this kind should never take place. I do not see any objection whatever to taking the interest of the life-membership fund and placing it into the general fund, and it ought to be done every year.

MR. TORBERT: I am defending the action of the Council, and I hope that it will not happen, for the first time in the history of this Association, that that action will be reversed. I do not, as a member of the Council, like to oppose the new President, or a man of such ability as Mr. Ebert. I agree with Mr. Seabury, however, that this Association should not engage in a discussion over a matter of this kind for a moment. In my judgment, the word "shall" as used in its present connection cannot be construed by intelligent men as mandatory. It is rather directory, and, as a matter of fact, there is not to be any final analysis. This money comes over into the general fund as interest. Now, whatever surplus there is at any time in the general fund is put at interest, and as a matter of fact, and record, last year, three thousand dollars of that money in the general fund was invested, was put at interest, and is going into the accumulations and accretions of this Association. Why, then, should this change be made? It makes no difference in the final result; it cannot possibly be construed that the men who framed this Constitution intended that this Association should spend its fund profligately, because the word "shall" was employed. Do not let us reflect on the wisdom of the men who drew up that Constitution by any such action as is contemplated in this amendment.

MR. SHEPPARD: It may be of interest to members to have the figures in regard to the life membership fund, and the facts that exist regarding it. We have received from members for life membership fees a total sum of $1810. Now, if that word "shall" had been considered mandatory, this life membership fund would simply stand to-day at this amount, namely, $1810. But from the report given a few moments ago by the Chairman of the Council, you will notice that that life membership fund at the present time amounts to something over $10,000. That $10,000 is made up of this $1810, some accumulated interest on the same, and additions to it, which have come by vote of the Association. This plainly shows that we have never considered that word "shall" as mandatory, but exactly in the same light as we would if it had been "may." If we make it mandatory, then, if I am not mistaken, we reduce the life membership to its

legitimate figures, $1810, and take out of it every year the interest on that sum, putting it into the general fund, and when that fund increases, so that we do not need to use all that we have, we invest it in another fund. This life membership fund has really been used as a general fund. Now, during the past year we had a surplus of some three thousand dollars, and the Council voted to invest it in such a way that it would bring five per cent. into the Association instead of three per cent. (and that is practically what government bonds bring), so that we have a general fund this year which brings us in five per cent.; but it is merely a question of getting a little more interest on the cash balance, than if we allowed it to remain with the Trust Company, where we receive only 2½ per cent.

MR. OLDBERG: I believe the amendment is unwise. My experience in other societies to which I belong is, that the word "may" is a very dangerous word to have in a Constitution. It gives rise to confusion, as it does here. The word "shall" is much better. I believe we cannot do much better than vote the amendment down.

MR. GOOD: While I would like to see the amendment voted down, I would not like to have that done with the understanding that we are to reduce this fund to $1810, and leave it in the general fund.

Mr. Watson here moved that the amendment be laid on the table, and the motion being duly seconded, was put to a vote and carried.

The Permanent Secretary presented an amendment to Chapter IX, Article VII., of the By-Laws, offered by Mr. Sheppard at the last annual meeting, by inserting after the word "eighth" the words "and ninth," making the article read:

"At the eighth and ninth sessions the Section of Pharmaceutical Legislation and Education shall consider the business assigned to that Section."

On motion of Mr. Good, the amendment was unanimously adopted.

SECRETARY MAISCH: At the last meeting Mr. Stevens moved to amend the By-Laws by striking out Article V., Chapter VIII., of By-Laws, or amending it by inserting the word "State" in place of "local." The article would then read:

"All *State* organizations of pharmacists shall be entitled to five delegates, as their representatives in the annual meetings, who, if present, become members of the Association on signing the Constitution and paying the annual contribution for the current year; Provided, that the provisions of this article shall not be so construed as to reinstate any member whose name shall have been dropped from the roll for non-payment of dues; nor shall any one who has been expelled from the Association be received as a delegate. All credentials should be sent to the Permanent Secretary *at least* two weeks in advance of the annual meeting."

MR. SHEPPARD: I hope that amendment will not be adopted, for this reason: The idea of appointing delegates is practically a useless procedure, as far as our business here is concerned, but it is valuable as forming a connecting link between this national Association and all local organizations. From that standpoint, therefore, it is better for us to keep in touch with the local organizations, rather than to confine our sympathies to state organizations only. There is no reason why the Alumni Associations, for instance, should not have the privilege of appointing delegates, which would thereby cause them to take an interest in the aims of the A. P. A., and send representatives here, whereas they

otherwise might not. The delegates who come here have only one privilege, and that is of joining the Association without being invited to join. Now, if we stop and think a moment, I believe we will agree that that is not a very great privilege. In olden times, before the present arrangement was concluded, we gave each delegation a representation on the Nominating Committee. By our By-laws adopted five years ago, the representation on the Nominating Committee is now properly confined to the states, each state having one or two representatives. It seems to me there can be no possible harm in allowing any local Association (be it what it may) to send delegates here. Let them send as many as they choose, and if they attend our meetings and become interested in pharmaceutical work, a good result will have been attained. I sincerely hope that the clause will remain as it now is.

On motion of Mr. Nattans, the amendment was laid on the table.

SECRETARY MAISCH: At the last session an amendment to Chapter IV., Article IV., of the By-Laws, was offered by Mr. Whelpley, striking out the figures "$600," and inserting "$750," so as to make the article read as follows:

"He shall present a statement of his accounts at each annual meeting to the Council, that they may be audited; he shall receive an annual salary of $750, and the amount of his expenses incident to the meeting in addition to his salary."

MR. WHELPLEY: At the time this amendment was presented, there was no opportunity afforded me to explain why it was presented; but, I would state that the matter came to my mind in connection with the large number of new members now joining the Association, and the increasing work of the treasurer in following up these members, collecting dues, etc. I saw that as the membership increased the duties of the treasurer would become more arduous, but I was not prepared to find out at that time, as I did afterwards, that the treasurer at one time received $750.00 per year; that six years ago, when the present treasurer was elected, the Association not being in a very flourishing condition, he donated, as it were, $150.00 a year, and has been doing it ever since, making $900.00 in the last six years. I am sure we do not feel like continuing to accept that donation under the present circumstances, so that this motion would simply restore the salary of the treasurer to what it was six years ago, when the work was less than it is now.

On motion of Mr. Canning, the amendment was unanimously adopted.

SECRETARY MAISCH: Before we adjourn, I wish to bring forward a subject which ought to come before the Association; it would be well to discuss it, and dispose of it. It is a suggestion which comes from an old and valued member of the Association, Mr. Abernethy, of Jersey City. In a personal letter to me, he says: "I desire to call your attention to a matter that will be of great service to pharmacists, and one that the American Pharmaceutical Association might deem practicable at the next meeting. It is, to have an official dose-book, embracing the standard and most valuable preparations, new remedies of which we can procure but little information as to the dose, etc., from our regular journals. This might be prepared at a nominal cost, and it would supply a long-felt want."

I do not wish, at present, to recommend this, but merely state that this question of a list of doses, and particularly of maximum doses, has been up repeatedly before the National Convention for the Revision of the Pharmacopœia, and since 1870, I think, the matter was before the final Committee on Revision at various times. There seem to be serious objections, however, under our present laws, to preparing an official dose-book.

MR. SHEPPARD: While there is an objection to an official dose-book, there is a tre-

mendously strong demand for a dose-book. I think that is one of the questions that this Association can take up. It might be well to have it appended to our National Formulary, which is a semi-official publication. I move that this matter be referred to the Section on Scientific Papers.

The motion was duly seconded and carried.

On motion of Mr. Eliel, the Association adjourned until Friday morning at 10 o'clock.

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THIRD SESSION—FRIDAY MORNING, JULY 15.

The session was opened at 10 o'clock, President Finlay in the chair. The Permanent Secretary read the minutes of the second session, which were on motion approved.

Mr. Kennedy presented the names of 72 candidates for membership, with the favorable recommendation from the Council. On motion the candidates were invited to join the Association.

Mr. Thompson, on behalf of the committee appointed to consider the President's address, presented the following report:

PROFILE HOUSE, N. H., July 14, 1892.

*To the American Pharmaceutical Association:*

*Gentlemen:* Your Committee to whom was referred the President's address to report on the recommendations therein contained, beg to submit the following recommendations in the order in which the several subjects occur in the address:

1. The suggestion that the delegates from this Association to the American Medical Association be selected from such of our members as are qualified for membership in the latter body, thereby affording them the opportunity of debate and voting on equal terms with other members of the American Medical Association, is a desirable step, and such members of our Association, when otherwise well qualified, ought to be preferred as delegates. But, your Committee are of the opinion that the interests and dignity of our Association on such occasions are best maintained, when we are represented by those members who are known and respected for their knowledge and skill in the science and art of pharmacy, and we deem it unwise to adopt a rule that would prevent their appointment because they were not members of an allied profession.

2. Mention was made by the President of the approaching International Pharmaceutical Congress, with a recommendation that a sum be appropriated to assist in defraying the expenses incidental to the Congress, where the Association is expected to be the host. Both the importance and necessity of providing the needed funds for the occasion must be apparent to all of us, and inasmuch as the subject is now before the Council, it is recommended that so much of the President's message as relates to the International Pharmaceutical Congress, be referred to that body.

3. The allusion of the President to those older members who have faithfully served the Association, aiding in its counsels and enriching its literature, to whom some tribute of our esteem is due, will meet the sympathy and approval of all. The details for the successful execution of the designs need time and care to complete them, and we would recommend that the subject be referred to a special committee of five, to develop and formulate a plan embodying the President's idea.

All of which is respectfully submitted.

W. S. THOMPSON,
M. W. ALEXANDER,
HENRY CANNING.

On motion of Mr. Kennedy, the report was accepted and referred for publication.

The Association then adjourned to give way to the Section on Commercial Interests.

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FOURTH SESSION.—FRIDAY AFTERNOON, JULY 15.

The Association did not transact any business preceding the second session of the Section on Commercial Interests.

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FIFTH SESSION.—SATURDAY MORNING, JULY 16.

President Finlay called the meeting to order at 10 o'clock. The Permanent Secretary read the minutes of the third and fourth sessions, which on motion were approved.

Mr. Kennedy presented the names of seventeen applicants for membership, with favorable recommendations from the Council. On motion, they were invited to join the Association.

Mr. Hopp presented the following, which, under the rules, lies over until the last session:

Amend Chapter VIII., Art. II., of the By-Laws, by striking out in the third line the words "and if the Association shall," and inserting in place thereof the following:

"Post the name of the person in some suitable place in the meeting hall near the beginning of a session; objection, if any, to be made in writing to the Secretary of the Council previous to the Association taking any action on the proposition. Near the close of the same, or at a subsequent session the Association may."

Also insert in line 4, after the word "member," the words "after which," so as to make the Article read as follows:

"ARTICLE II. Any two members of the Association may propose to the Council the name of any person eligible to membership, and, if approved, the Council shall recommend the person named to the Association, and post the name of the person in some suitable place in the meeting hall, near the beginning of a session; objection, if any, to be made in writing to the Secretary of the Council previous to the Association taking any action on the proposition. Near the close of the same or at a subsequent session, the Association may by vote invite said person to become a member, after which his membership shall be completed by his signing the Constitution and By-Laws, and paying the annual contribution for the current year."

The Association then adjourned, to give way to the Section on Scientific Papers.

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SIXTH SESSION—SATURDAY AFTERNOON, JULY 16.

Vice President Torbert called the Association to order at 3:45 o'clock. The minutes of the fifth session were read by the Permanent Secretary, and on motion were approved.

Mr. Sheppard presented the following amendments to the By-laws, which have to lie over until the final session of the Association:

Chapter VII., Article II., strike out the word "appointed," and insert in place thereof the word "elected."

Also Chapter VII., Article III., strike out the word "appointed," and insert "elected."

Also Chapter IX., Article IV., in line 3 strike out the word "and;" also add to the article the words, "and receive propositions for amendments to the By-laws."

On motion, the Association now adjourned.

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SEVENTH SESSION—SATURDAY EVENING, JULY 16.

No business was transacted by the Association at the beginning of the third session of the Section on Scientific Papers.

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EIGHTH SESSION—MONDAY MORNING, JULY 18.

President Finlay called the Association to order at 10 A. M. The minutes of the sixth and seventh sessions were read by the Permanent Secretary, and on motion approved.

Mr. Kennedy presented the names of 8 candidates for membership, who, being favorably recommended, were invited to join the Association.

PRESIDENT FINLAY: Before adjourning, I think that a Committee on Resolutions should be appointed for the purpose of making suitable expressions. I will appoint for that purpose Messrs. Alexander, Thompson and Ryan, who will report at the last session.

On motion, the Association adjourned, to give place to the Section on Pharmaceutical Education and Legislation.

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NINTH SESSION—MONDAY AFTERNOON, JULY 18.

Preceding the second session of the Section on Legislation and Education, no business was transacted by the Association.

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TENTH SESSION—MONDAY EVENING, JULY 18.

President Finlay called the Association to order at 8:30 o'clock. The minutes of the eighth and ninth sessions were read by the Permanent Secretary, and on motion approved.

The Secretary of the Council read the minutes of that body, and on motion they were approved. The business transacted by the Council was as follows:

FIFTH SESSION OF THE COUNCIL.—PROFILE HOUSE, JULY 14. Present, 9 members.

The applications and recommendations of 72 candidates for membership were examined, and ordered to be favorably reported to the Association.

On motion of Mr. Sheppard the name of Maxwell Abernethy, of Jersey City, and on

motion of Mr. Torbert that of C. F. L. Hohenthal, of New York City, were placed upon the roll of life members old style. Both had joined in 1865, and had waived their rights under the old Constitution.

SIXTH SESSION.—PROFILE HOUSE, JULY 16, 9 A. M. Present, 10 members.

The applications of 17 candidates for membership were examined and ordered to be reported to the Association with favorable recommendation.

A communication from Chas. Rice, relating to the Report on the Progress of Pharmacy, was received and ordered to be filed, no action being required.

The report of the Committee on International Pharmaceutical Congress, referred to the Council, was taken up in the regular order of the recommendations made by the Committee, and the following action had thereon:

*Resolved*, 1. That the governments of the different countries, the Pharmaceutical Societies and Examining Boards, the Colleges and Schools of Pharmacy and the Pharmaceutical Departments of Universities, also Pharmacopœial Committees or Commissions, be each invited to send three delegates to the Seventh International Pharmaceutical Congress.

2. That special invitations be also sent to teachers, authors, leaders of the pharmaceutical profession, and pharmacists generally, to be present.

3. That in order to defray the expenses attendant upon the Congress, members from the United States, and members of the American Pharmaceutical Association residing in other countries who may take part in this Congress be each required to pay the sum of five dollars, their admission as members to be conditioned upon their consent to this assessment; but that no assessment be made upon other members or visitors.

SEVENTH SESSION —PROFILE HOUSE, JULY 16, 1:30 P. M. Present, 8 members.

On motion of J. M. Maisch, it was decided that the next annual meeting of the Association commence on the third Tuesday in August, 1893.

Further action was taken on the recommendations relating to the International Pharmaceutical Congress, as follows:

*Resolved*, 4, That the date of opening the Seventh International Pharmaceutical Congress be fixed for the fourth Tuesday of August, 1893.

5. That the proceedings of the Congress be in the English language, and that three interpreters and translators be employed to act as interpreters at the sittings, and to translate letters, papers, and proceedings into German, French and Spanish respectively, and that the Proceedings be published in German, French, Spanish and English.

6. That the Committee on International Pharmaceutical Congress be enlarged by the appointment of at least fifteen additional members.

7. That an appropriation of one thousand dollars out of the treasury of the American Pharmaceutical Association be placed at the disposal of the Committee, to be expended in defraying the necessary expenses involved, subject to the approval of the Council.

8. That in all matters upon which the Association may not at this meeting adopt specific rules or instructions, the enlarged Committee on the Seventh International Pharmaceutical Congress be given authority to act according to its best judgment, observing as far as practicable the precedents established by previous International Pharmaceutical Congresses.

On motion of Mr. Sheppard, a Committee, consisting of the Chairman of the Council and Mr. Maisch, was appointed to present to the Council on Monday morning additional names to be placed on the Committee called for in the sixth resolution.

The names of two candidates for membership were favorably passed upon, and directed to be presented to the Association.

EIGHTH SESSION.—PROFILE HOUSE, JULY 18, 9 A. M. (Present, 9 members.)

The propositions of six candidates for membership were examined and directed to be favorably reported to the Association.

A communication from Chas. Rice relating to the completion of the Report on the Progress of Pharmacy was read and referred to the Committee on Publication. (See page 37.)

On motion of Mr. Conrath, seconded by Mr. Maisch, it was resolved that Mr. E. B. Helmstreet, of Janesville, Wis., be reinstated a member of the Association, for the reason that he was irregularly dropped, and that his dues be remitted for the years that he has not received the Proceedings of the Association.

NINTH SESSION.—PROFILE HOUSE, JULY 18, 6 P. M. Present, 10 members.

Thirteen propositions for membership were examined and ordered to be favorably reported to the Association.



The Treasurer stated that a member had requested to be furnished with a certificate of membership in lieu of the Proceedings. A motion by Mr. Whelpley that in all such cases the usual method of procedure be adhered to, was adopted.

The special Committee for nominating additional members of the Committee on International Pharmaceutical Congress presented the following names, all of whom were duly elected:

N. Gray Bartlett, Chicago, Ill.
C. L. Diehl, Louisville, Ky.
C. T. P. Fennel, Cincinnati, O.
J. M. Good, St. Louis, Mo.
J. N. Hurty, Indianapolis, Ind.
J. Kochan, Denver, Col.
E. Kremers, Madison, Wis.
A. L. Metz, New Orleans, La.
Chas. Mohr, Mobile, Ala.
E. L. Patch, Boston, Mass.
A. B. Prescott, Ann Arbor, Mich.
Chas. Rice, New York, N. Y.
H. H. Rusby, New York, N. Y.
Wm. Saunders, Ottawa, Can.
L. E. Sayre, Lawrence, Kan.
Wm. Searby, San Francisco, Cal.
Wm. Simon, Baltimore, Md.
Wm. Simpson, Raleigh, N. Car.
Wm. S. Thompson, Washington, D. C.

On motion of Mr. Sheppard it was ordered that the names of members reported to be in arrears for three years or more, in case payment should not be made by the time the Proceedings are being printed, be dropped from the roll, and that the list be published in the next volume of Proceedings.

The Council then adjourned *sine die*.

The Council, through its Secretary, presented the names of thirteen candidates for membership, and it was stated that the total number admitted at this meeting exceeded four hundred, one-third of whom had already completed their membership. On motion of Mr. Kennedy the candidates were invited to become members.

The Permanent Secretary stated that several reports which should have been presented at the second session, could now be disposed of.

Mr. Torbert asked unanimous consent for the Nominating Committee to present the report on the selection of a Local Secretary. No objection being made, Mr. Whelpley thereupon read the following report: "The Nominating Committee presents the name of C. S. N. Hallberg, of Chicago, for Local Secretary."

MR. HALLBERG: Mr. President, and members of the American Pharmaceutical Asso-

ciation: It is certainly a great honor to be selected as the one whose duty it should be to endeavor to the best of his ability to care for the Association at the meeting next year. It is very seldom, I think, that we could find in any city in this country a gentleman that represents the affability, the majestic as well as the magnetic presence of our friend Mr. Whitney (applause). I do not think that I am constituted to fill a position of that kind, no matter how much I possibly could attempt to do so for the interests of the Association. Besides, it is a position that requires work of a peculiar character, work which I possibly am not so well fitted for as somebody else. I would, therefore, like to ask the Association to substitute the name of a gentleman in Chicago who, I am satisfied, will fill the position with credit to the local fraternity, and that means to the entire satisfaction of the ladies and gentlemen who will visit the World's Fair city next year. Mr. President, I desire to ask that my name be withdrawn, and in place thereof substituted the name of one of the oldest members of this Association, Mr. Henry Biroth (applause).

MR. EBERT: I wish to say, in seconding that nomination, that it gives me the greatest pleasure that I have ever had in this body. Mr. Henry Biroth will be the man for the place, and I thank Mr. Hallberg heartily, for he will unite all conflicting interests, if there have been any. I will say further, ladies and gentlemen, that when you come to Chicago, with Mr. Henry Biroth as Local Secretary, you can come there assured that you will be welcomed by one united body. Again I thank Mr. Hallberg for having nominated so good a man as Mr. Biroth.

MR. MARTIN: I also desire to second the nomination of Mr. Henry Biroth. He is one of the oldest druggists in Chicago, who by long experience and pleasing manners has always been held in high esteem by the public of the entire city. In all differences he was the one man who always held aloof and counseled moderation, and for that reason I know of no one in Chicago who could be chosen to fill the position of Local Secretary to greater advantage to the American Pharmaceutical Association, and more creditably.

Mr. Hallberg's request to withdraw his name was, by a rising vote, unanimously concurred in; and, by a rising vote, the Secretary was instructed to cast the ballot for Mr. Biroth's nomination, which having been done, Mr. Biroth was declared duly elected Local Secretary.*

The reports of committees were now called for, and Mr. Remington presented the following:

## REPORT OF DELEGATES TO THE SECTION OF MATERIA MEDICA AND PHARMACY OF AMERICAN MEDICAL ASSOCIATION.

Your Committee who were appointed by the President (upon invitation of the American Medical Association) to form a delegation to the latter body, to aid in the organiza-

* The following letter has been received by the Secretary:

CHICAGO, *September 1, 1892.*

*Dear Sir:* Your esteemed letter of August 11th, informing me of my election as Local Secretary of the American Pharmaceutical Association for the meeting to be held in Chicago during the World's Fair in 1893, duly received. I greatly appreciate the honor which the Association has conferred upon me, and the confidence the Council has placed in me; and with the hearty co-operation of the Committee on Arrangements, and the unanimous support of the Chicago druggists, I shall endeavor to make the coming meeting a success.

Respectfully yours,

HENRY BIROTH.

tion of a Section of Materia Medica and Pharmacy, beg leave to report that they have performed the duty which was assigned to them. To say that the delegation was received with cordiality and welcome, does not fully express the manner of their reception; there can be no question that a very auspicious beginning of the establishment of more harmonious and useful relations between the two professions has been firmly established. A brief sketch of the proceedings is hereby appended:

SECTION XII, ON MATERIA MEDICA AND PHARMACY.

The Section on Materia Medica and Pharmacy of the American Medical Association met in Grand Army Hall, in the city of Washington, on the afternoons of May 5, 6, and 7, 1891, Frank Woodbury, M. D., of Philadelphia, Pa., chairman. H. G. Ewing, M. D., of Nashville, Tenn., being absent, owing to sickness, F. E. Stewart, M. D., of Wilmington, Del., was elected Secretary *pro tem.*

In addition to the members of the American Medical Association attending the Section, there was present a delegation from the American Pharmaceutical Association, including Joseph P. Remington, of the Philadelphia College of Pharmacy, chairman of the committee; Mr. Alfred B. Taylor, of Philadelphia, Pa., the venerable ex-president of the American Pharmaceutical Association, who had served on the committee for revising the United States Pharmacopœia since 1840; Prof. J. M. Maisch, of Philadelphia; Prof. Edgar L. Patch, of the Massachusetts College of Pharmacy, Mass.; Prof. Chas. T. P. Fennel, State Chemist of Southern District, Cincinnati, Ohio; Mr. B. T. Fairchild and Prof. Bedford, of New York City. This delegation was welcomed appropriately by the chairman, and invited to take part in all deliberations of the Section. A committee of the Section was formed to act on publication of papers and other business that might be referred to it, this committee consisting of the officers of the Section and Joseph P. Remington.

The following papers were read and discussed:

1. Pharmacopœial Nomenclature and the Latin of Prescriptions, by Prof. Joseph P. Remington, of the Philadelphia College of Pharmacy, and member of the committee for revising the United States Pharmacopœia.

2. The Present Status of Materia Medica and Therapeutics, by J. W. C. Cuddy, M. D., of Baltimore, Md.

3. The Working Bulletin System: A proposed Investigation of the Materia Medica of the World under the Auspices of the Government of the United States, by Frank E. Stewart, M. D., of Wilmington, Delaware, Demonstrator of Materia Medica and Pharmacy, Jefferson Medical College, Philadelphia.

4. The Future Chemist, by Prof. Chas. T. P. Fennel, of Cincinnati, State Chemist for the Southern District, Ohio.

5. Discussion on the United States Pharmacopœia, opened by Prof. Horatio C. Wood, M. D., etc., president of the Convention for the Revision of the United States Pharmacopœia. In this discussion participated Prof. Remington; Dr. Kirnan, of Chicago; Prof. Whelpley, of the St. Louis College of Pharmacy; Dr. Prentiss, of Washington; Prof. Patch, of the Massachusetts College of Pharmacy; Prof. Maisch, of the Philadelphia College of Pharmacy, member of the Committee on Revision, and Permanent Secretary of the American Pharmaceutical Association.

6. On the Relation of the Profession to Drugs Bearing a Trade Mark; with some Remarks in Regard to the Value of the Pharmacopœia to the Physician, by Hobart A. Hare, M. D., Professor of Materia Medica and Therapeutics in the Jefferson Medical College, Philadelphia.

7. Pharmacy for Medical Men, by Prof. P. W. Bedford, of New York City, member of the Committee for revising the United States Pharmacopœia, etc.

8. American Pharmacy and Legislation, by H. P. Reynolds, Plainfield, N. J.

The following papers were read by title:

1. The Relations of Physicians and Pharmacists, by E. L. Boggs, M. D., Charleston, W. Va.
2. On the Officinal Sulphocarbolates, by Wm. F. Waugh, M. D., Philadelphia, Pa.
3. Potassium Chlorate; Its Toxic Effects, by G. A. Fackler, M. D., Cincinnati, Ohio.
4. Some Notes on Old Remedies, by Prof. L. E. Sayre, of the University of Kansas.
5. "Guests of This Hotel are Not Permitted to Use Iodoform," by I. N. Love, M. D., St. Louis, Mo.

A very important communication from Dr. Chas. Rice, of New York, chairman of the committee for revising the United States Pharmacopœia, was read, proposing a commission of physicians and pharmacists, to be appointed jointly by the American Medical Association and American Pharmaceutical Association, for the consideration of subjects, both scientific and ethical, of mutual interest to the professions of medicine and pharmacy, and to report annually to the American Medical Association.

In the discussion upon this paper, it was generally conceded that the recommendation of Dr. Rice was timely and valuable, and that the formation of the Section on Materia Medica and Pharmacy was instigated by the same motives and opinions expressed in the communication, as by this means any subject of interest and importance to medicine and pharmacy could be reported promptly to each National Association.

The papers having all been read, a business session was held.

The business committee of the Section reported:

1. That as the communication of Dr. Rice was also covered by Dr. Stewart's paper, suggesting the formation of a special society of physicians and pharmacists, and as the subject was a very important one, that the entire subject be referred back to the committee, to bring before the Section again next year for further consideration.
2. It was recommended that the committee bring before the meeting next year a plan for more complete organization, with the view of facilitating business and developing the interest of members of the American Medical Association in the Section on Materia Medica and Pharmacy.
3. Resolved, that the Government of the United States be memorialized by the American Medical Association in favor of the plan proposed by Dr. F. E. Stewart, whereby the laboratories of the army, navy, marine hospital service, Smithsonian Institution, customs service, agricultural department and other departments of the Government having charge of the analysis and identification of drugs, may be facilitated, and the results of their investigations made public, and that the information thus gathered may be disseminated for the general benefit of the professions of medicine and pharmacy.

The report of the committee was accepted and adopted, and the last resolution was directed to be referred to the general session of the American Medical Association for its consideration by the chairman of the Section.

An election of officers for the ensuing year resulted in the re-election of Dr. Woodbury as chairman, and for secretary Dr. H. M. Whelpley, of St. Louis, was unanimously chosen, the Secretary casting the ballot of the meeting.

The Section then adjourned.

Signed:

FRANK WOODBURY, M. D., *Chairman.*

F. E. STEWART, M. D., *Secretary pro tem.*

The second annual meeting of the Section was held June 7th, 8th and 9th, in the city of Detroit. The proceedings opened on Tuesday, June 7th, with an address of the chairman, Dr. F. Woodbury, of Philadelphia. A very valuable paper was read by Prof. A. B. Prescott, of Ann Arbor, upon "Caffeine and the Question of Its Isomerism," following which, a paper on "The Examination of Market Fluid Extracts," by Prof. E. L. Patch,

was read, together with one on "Pharmacy at Health Resorts," by Dr. F. E. Stewart, of Wilmington, Del.

Upon the following day a discussion upon the Revision of the United States Pharmacopœia was participated in by the members present, and succeeding this, came a discussion upon the "International Pharmacopœia," which was opened by the Chairman.

The last meeting of the Section was occupied with reading the following papers: "On Europhen," by Dr. J. V. Shoemaker, of Philadelphia; "On Tablet Triturates and Dosimetric Granules," by Dr. W. F. Waugh, and lastly on "Notes on Therapeutic Novelties," by Dr. I. N. Love, of St. Louis. In addition to the foregoing, a valuable communication on "Collaboration in Pharmacy," by Dr. Charles Rice, was read and its recommendations were adopted by the Section.

Before concluding this report, your committee desire to express the opinion that the action of this Association in sending the delegation to the American Medical Association has been productive of results which, if properly encouraged, will prove of lasting benefit. It is now a common act of courtesy for State Pharmaceutical Associations to send representatives to State Medical Societies, and for physicians to return the courtesy by visiting State Pharmaceutical Associations. In the Pennsylvania Medical Society, at their late meeting, resolutions were passed deprecating the law which permits physicians to practice pharmacy without passing examinations in practical pharmacy, and also condemning the habit of some pharmacists who prescribe remedies for the cure of disease without possessing the requisite qualifications. Another proof of the unity of effort between physicians and pharmacists is evidenced by the passage of the following resolutions at the meeting of the American Medical Association—these had received the previous endorsement of the State Medical Society of Pennsylvania:

*Resolved*, That the attention of the trustees of the Journal of the American Medical Association be called to the fact that the Code of Ethics prohibits all commendatory mention or advertisement of secret preparations, and that said trustees be instructed to respect said prohibition in the future conduct of the official Journal of this Association.

In conclusion the Committee desire to express the hope that the American Pharmaceutical Association will authorize its President to tender an invitation to the American Medical Association to send a visiting delegation to the next meeting of the Association at Chicago.

Respectfully submitted, JOSEPH P. REMINGTON, *Chairman*.

On motion of Mr. Alexander, the report was received and referred for publication.

Secretary Maisch moved that the recommendation appended to the report, that the American Pharmaceutical Association authorize its president to tender an invitation to the American Medical Association to send a delegation to the next meeting at Chicago, be approved.

MR. REMINGTON: Before the motion is put, I desire to say that informally I was led to believe that, if time had permitted to call the delegation together, the president of the American Medical Association and the secretary, with a delegation, would have been very glad to have met with us here, and this is evidenced by the fact, which you remember, that the President of the American Medical Association sent a telegram to us. In this connection, I would like to make the suggestion that the secretary acknowledge that telegram in some way. Were it not for the fact that the American Medical Association has had two meetings since we have met in New Orleans, there would have been plenty of time to have presented an invitation in due form. They have royally treated our delegation on both occasions, and I think the least we can do is to return the

courtesy and invite them, and I feel certain that if the invitation is sent in proper official form that they will be glad to attend.

The motion was duly seconded and carried.

Mr. Remington next presented the following report of the Committee on the Metric System:

## REPORT OF THE COMMITTEE ON THE ADOPTION OF THE METRIC SYSTEM.

Your Committee to whom was intrusted the duty of endeavoring to secure favorable legislation from Congress, looking to the adoption of the Metric System, beg leave to make the following report. Upon examination and consultation it was believed to be the best judgment for this Committee to join hands with the American Metrological Society, the Society for the Advancement of Science, the Academy of Sciences of Chicago, and other bodies, in memorializing Congress to secure support for the following Act. To lay this matter properly before the heads of the Government Departments and Congress, two of the members of the Committee visited Washington personally a few months ago, and the chairman was requested to send written communications to the Secretaries of State and Treasury, and members of Congress.

This was done, and below will be found the correspondence:

*To the Honorable the Senate and House of Representatives of the United States, in Congress assembled:*

The undersigned respectfully prays your honorable body to make the following enactment, which, except for the postponement of two years in the date of its going into effect, is the same which was submitted for the consideration of the 51st Congress by the Secretary of State, in his letter transmitted to Congress by the President, July 10, 1890.

*Be it enacted by the Senate and House of Representatives of the United States of America, in Congress assembled:*

That on and after July 1, 1893, the Metric System of Weights and Measures, authorized by the Act of Congress approved July 28, 1866, shall be used exclusively in the customs service of the United States.

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PHILADELPHIA, *May* 20, 1892.

HON. JAMES G. BLAINE, *Secretary of State, United States of America.*

*Dear Sir:* I beg leave to urge at this time upon your attention the necessity for some action upon the Act which has been before the House of Representatives upon a previous occasion, in reference to the Metric System, and which reads as follows: That on and after July 1, 1893, the Metric System of Weights and Measures authorized by the Act of Congress approved July 28, 1866, shall be used exclusively in the customs service of the United States.

Your knowledge of the commercial needs of this nation requires no suggestions at my hands; but, if you will permit me, I will call your attention to the late action of the Decennial Association in England, which is doing its utmost and working very successfully among the manufacturers of Great Britain, in urging them to send their goods to South America, measured and weighed according to the standard of the Metric System. This action on their part is no longer a question of choice; it is based upon an overwhelming conviction, that the markets, which have heretofore been almost exclusively controlled by the British, were rapidly yielding to the onslaughts made by outside nations, particularly those by Germany.

It requires no great commercial prescience to point out the fact that the quality of the

goods being equal and the price being satisfactory, that preference should be given the goods which are weighed and measured by the standards in common use in the country in which the goods are to be consumed. This being the case, it must surely follow that a merchant will not take the trouble to recalculate his invoices and put up with the annoyances which result from such troublesome calculations, involving fractions, unless the goods are so much superior in quality or cheaper in price as to warrant such expenditure of time and labor.

You know better than I do the extent and energy of business competition at this time for this very desirable trade; and if Great Britain with her proverbial slowness to accept new ideas, with her fierce hatred of the Metric System, finds it expedient to adopt Metric Measures, the importance of similar or more extended action on the part of the United States must be apparent. While England loves her Imperial Measures, she loves the nimble six-pence better. In addition to this, even the nations of the Orient, China and Japan, are seeing the necessity of falling into line, and I send you two quotations which bear out this statement. Colonel Howard Vincent, C. B., M. P., has recently been traveling in China and Japan, and in a report addressed to the Central Traders of Sheffield entitled "British Interests in China," he says that "A recommendation is about to go forth from a high authority to whom attention is paid, that China should adopt, as Japan has already done, the Metric System of France and Germany. Unless this is fully realized there will be a loss of valuable business." In a separate report on Japan addressed to the Master Cutler of Sheffield, Colonel Vincent remarks, "The Director of the Imperial Japanese Artillery (Lieutenant Colonel T. Ota), an experienced officer with European training, expressed himself as fully sensible of the excellence of the metal manufactures of Sheffield and of their superiority in cost, quality and workmanship, and in originality of design. Notwithstanding these advantages, he considered it so easy for mistakes to be made in the measurement by feet and inches where exact dimensions were important, that his Government preferred to order their material from Creuzot in France, and from Krupp in Germany, where the Metric System is used, so that they may be relieved from trouble and anxiety."

What curious spell has palsied the shrewd wits of Americans and prevented them from seeing and taking advantage of this chance to push her commercial interests! Why does she allow the mother country whom she has outstripped and beaten on every field of contest, to reach out and beat her in this direction! At last up hobbles China, centuries behind any other nation in commercial acumen and in modern methods, and even she adopts a system foreign to her alleged aspirations, wants and desires, and hateful in the sight of all her great and little people. But, because she knows that she must do it or drop out of the race, she quickly yields. Now to turn to the action of various bodies in our own country who have realized the value of the Metric System, let me first call your attention to the most important step yet taken by any organized body in the United States. In May, 1890, there assembled in the city of Washington, the Decennial Convention for revising the Pharmacopœia of the United States of America. This book is the standard authority which regulates the strength and proportions of the official preparations used as medicines by the physicians and pharmacists of the whole country. This Convention adopted by an almost unanimous vote the Metric System. The Revision Committee are actively at work upon a new edition of the Pharmacopœia, and it is expected that the new book based solely upon Metric measures will be issued within a year.

The American Pharmaceutical Association, composed of educated pharmacists throughout the United States, meeting annually in the various cities of the Union, having on its roll over 1200 members representing every State, appointed a Committee two years ago to take such steps as they deemed necessary to promote the use of the Metric System, and to urge Congress to further the use of the Metric System to as great an extent as possible.

You are doubtless aware of the action of the American Metrological Society, as well as of that of the American Association for the Advancement of Science, in this connection, as earnest advocates of the Metric System.

The Committee appointed by the American Pharmaceutical Association desires to present these facts, and they most respectfully urge their consideration, with the hope that the present Congress will pass the Act above referred to, believing that it will be an important step forward in contributing not only to the material interests of the United States, but it will bring us abreast of the advanced thought of the other civilized nations of the world, and obliterate the stigma that rests upon the fair name of the most progressive and most glorious republic on which the sun has ever shone.

Signed for the Committee,
JOSEPH P. REMINGTON, *Chairman.*
OSCAR OLDBERG,
CHARLES RICE,
C. S. N. HALLBERG,
J. H. MANNING.

ACKNOWLEDGMENT OF LETTER OF MAY 20TH.

DEPARTMENT OF STATE, WASHINGTON, *May* 28, 1892.

JOSEPH P. REMINGTON, ESQUIRE, *Chairman of the Committee of the American Pharmaceutical Association, 1832 Pine St., Philadelphia, Pennsylvania:*

SIR: I have the honor to acknowledge the receipt of your letter of the 20th inst., advocating legislation requiring the exclusive use of the Metric System in the customs service of this country, and to inform you that a copy of your letter has been communicated to the Secretary of the Treasury.

I am, sir, your obedient servant,
WILLIAM WHARTON,
*Acting Secretary.*

REPLY TO LETTER OF MAY 20TH, 1892.

DEPARTMENT OF STATE, WASHINGTON, *July 11th, 1892.*

JOSEPH P. REMINGTON, ESQ., *Chairman Committee of American Pharmaceutical Association, 1832 Pine St., Philadelphia, Pa.:*

SIR: Adverting to my letter to you of May 28th last, concerning the exclusive use of the Metric System of weights and measures in the customs service of the United States, I have now to apprise you of the receipt of a letter from the Secretary of the Treasury, of the 4th ultimo, upon the subject. He states that the arguments presented by your Association confirm the opinion expressed by the Treasury Department in its letter of November 26th, 1890, to the Secretary of State, that such modification of the existing customs laws as would warrant the use of the Metric System in its administration, is advisable. That the situation may be perfectly clear to you, I will add that the letter of November 26, 1890, from the Secretary of the Treasury, was called forth in view of a communication from this Department of August 11, 1890. It enclosed a copy of the report and recommendations of the International American Conference lately in session at this capital by invitation of this Government, pursuant to Act of Congress approved May 24, 1888.

In submitting the report to the Secretary of the Treasury it was observed that the United States was the only country in which the Metric System was not used, both by the government and by the people, in ordinary business transactions, and that its adoption in this country was recommended by the Conference in question.

"The use of the Metric System in the United States," the letter continued, "was authorized by an Act of Congress approved July 28, 1866, and this Department would be glad to learn whether in your [the Secretary of the Treasury] opinion, the adoption in the customs service, so far as commerce with the other American Republics is concerned, would be advisable."

The letter of the 26th November, 1890, is the reply of the Treasury Department. It stated that this Department's letter and the report accompanying it were submitted to the Collectors of Customs at the various ports, with a request for their views on the subject and the method by which the Metric System could be applied to the customs service, and to what extent, if any, it could be applied under the laws now in force.

The Acting Secretary of the Treasury added that a diversity of opinion existed among the several customs officers, although it appeared to be conceded that the adoption of the System under the laws now in force was impracticable. There was thought to be no doubt, however, that if the customs laws were made to conform to the terms of the Metric System, it would facilitate commerce between this country and other American Republics, and also the transaction of the business of the custom houses.

I am, Sir, your obedient servant, WILLIAM F. WHARTON,
*Assistant Secretary.*

MR. REMINGTON: I would say further that the Committee paid personal visits to Washington, called upon Professor Mendenhall, of the Coast Survey, and Secretary Blaine. We were cordially received by the acting Secretary of State, owing to Mr. Blaine's illness and absence, and he gave his assurance of active support. We also saw in the Senate and House of Representatives the Chairmen of the Committees on Weights and Measures; were received very cordially, with assurances of all the help they could possibly give us in the matter, and they requested that letters should be sent to them personally, and it was done, in order that they might be brought before the Special Committees. Professor Mendenhall has taken up the subject very warmly, and at the State Associations that have met since our visit to Washington, copies of petitions have been presented, and, as far as I know, all the State Associations that have received them have passed resolutions recommending action on the petition. You observe that all that is attempted to be done at the present time is to get the Metric System used exclusively in the customs service. It was believed that this should be the first step, and if the Metric System were adopted in any one branch exclusively, it would eventually extend to others.

MR. ALPERS.—The New Jersey Pharmaceutical Association has sent a similar petition to the proper authorities at Washington, after correspondence had been submitted to us at our last meeting between Mr. Reynolds, of Plainfield, and Professor Mendenhall. The petition was sent to the representatives for New Jersey, and I believe that other Associations have followed a similar course. I move that the report be accepted, adopted, and referred for publication.

The motion was seconded and carried.

Mr. Seabury read the following report, which was, on motion, received and referred.

## REPORT OF THE COMMITTEE ON TRANSPORTATION.

Herewith we submit a circular, including a blank application for membership, copies of which have been transmitted to every member of this Association.

The Passenger Combinations granting us one fare and one-third, were the Grand Trunk Line, Central, Eastern and Southern Associations, covering nearly all the main lines of traffic, including their tributaries by land and water.

The Passenger Associations that refused to grant us a fare and one-third, or any concessions, were the Western and Trans-Missouri Combinations. In order to punish these illiberal transporters, we outflanked them in a Christian-like endeavor, and surrounded the situation in an educational manner; a similar plan of action should be taken advantage of by this Committee, since annually, popular organizations are conceded one fare, for an excursion ticket from the Pacific to the Atlantic Coast.

*Suggestions to Our Successors.*—Applications for reduced rates should be made at all the Railroad Centres covered by the Passenger Associations, not earlier than three months in advance of a meeting. When officially notified that rates have been made, send the terms received to all Pharmaceutical journals as soon as possible, and continue to publish same in each issue until the time of meeting, so as to impress the memory with the date and place of holding the Convention. This Committee should not give publicity to its special circular until about one month in advance of a meeting; that is usually the time that members seriously meditate or decide on the probabilities of being present.

The Circular from this Committee should be written plainly and as briefly as possible, furnishing all possible information about routes, so as to prevent unnecessary correspondence. It is also advisable to insert the topics and subjects that will be brought before the Convention, that are of interest to Pharmacists and Druggists generally—in a commercial, educational, legislative or scientific direction—this feature is an attractive one, and will tend to stimulate attendance.

A working Committee, such as this one has been, will invariably accomplish the best possible results. There has been no friction, all have been actuated by the same desire, that of making the Convention an emphatic success.

As this Committee in future will be a very important one, it will, doubtless, employ ways and means that tend to increase our membership. With the consent of the Chairman on Membership, we enclosed a blank application for members in our Circular as an experiment; we were so well satisfied with the results that we recommend that hereafter the Committee on Transportation shall annually enclose with its own Circular a blank application for membership, having printed thereon such portions of our Constitution as refer to the aims and objects of our Association, and the qualifications necessary to become eligible for membership, also special resolution concerning membership. It will be of considerable value to the Association to annually solicit membership by this Committee, in their own circular, directing applicants to address themselves to the Committee on Membership or the Permanent Secretary for blank applications.

It is also an attractive feature to have Committeemen, so far as possible, induce members to concentrate at great railroad centres, moving onward to the place of meeting in a body—thereby making it a family gathering, and decidedly more enjoyable than traveling in small parties.

The conditions on which special rates are granted should be clearly stated to members, to prevent misunderstanding, delays and loss of concessions.

The signing of certificates should be relegated to this Committee. A Secretary should be appointed each year to sign, receive and deliver certificates, and we recommend

"That the Secretary of the Committee on Transportation shall receive, sign and deliver all railroad certificates placed in his possession by members of this Association."

Your Committee desire to tender our thanks to the Pharmaceutical journals for the promptness with which they have printed our Communications and Report.

In closing this review, we take pleasure in submitting and recommending to our successors the general plan and style of our Circular. Hoping that we will all reach our homes safely and in good health, is the fondest wish of

The Transportation Committee,

GEORGE J. SEABURY, *Chairman.*

The amendment to the By-laws proposed by Mr. Hopp at the fifth session was called up. It provides for striking out in Chapter VIII, Article II, the words "and if the Association shall," and inserting the words "post the name of such person," etc, making the article read as follows:

Any two members of the Association may propose to the Council the name of any person eligible to membership, and, if approved, the Council shall recommend the person named to the Association and post the name of such person in the meeting hall near he beginning of a session, objection, if any, to be made in writing to the Secretary of the Council previous to the Association taking any action on the proposition. Near the close of the same, or at a subsequent session, the Association may, by vote, invite such person to become a member, after which his membership shall be completed by his signing the Constitution and By-laws, and paying the annual contribution for the current year.

SECRETARY MAISCH: I desire to call attention to the fact that there is no change proposed in the mode of electing persons to membership, but when the names are reported at the beginning of the session they are to be posted, so that each member of the Association can inspect them; and if no objection is raised within a reasonable time, the Association is to vote on the applications.

On motion of Mr. Thompson, the amendment was adopted unanimously.

Two of the amendments offered by Mr. Sheppard, at the sixth session, being merely verbal alterations changing the word "appointed" in Chapter VII., Article II., line 1, and in Article III., line 1, to the word "elected," were on motion of Mr. Torbert, adopted without opposition.

Mr. Sheppard's proposition to amend Chapt. IX., Art. IV., makes it read:

ARTICLE IV. The first, second and last sessions of the annual meeting shall be devoted to the general business of the Association, and sufficient time shall be assigned to the Association at the beginning of all other sessions to read its minutes, act on the report of Council on membership, and receive propositions for amendments to the By-laws.

It was on motion of Mr. Kennedy, unanimously adopted.

The Secretary read the following invitation, which, on motion of Mr. Martin, was received:

On behalf of the World's Congress Auxiliary of the World's Columbian Exposition, the American Pharmaceutical Association is hereby cordially invited to take part in the Columbian World's Congress of Pharmacists. This invitation extends to every member of the Association.

By the Pharmaceutical Committee of the Auxiliary,

OSCAR OLDBERG, *Chairman*.

A communication from Mr. A. Snyder, of Ohio, on the subject of membership, was received and on motion referred to the Committee on membership.

Mr. Hallberg stated that the Committee on Scientific Papers had received after the adjournment of the Section, two papers from Professor E. Kremers; in the elaboration of one paper entitled "The Menthol Group," he had taken advantage of the Centennial Fund; the second is entitled "Notes on Queries." Mr. Hallberg asked that the papers be placed on record.

Secretary Maisch moved that the papers be received and printed in the proceedings. The motion was seconded and carried.

Mr. Fennel, under instruction from the Section on Commercial Interests presented the following report of the committee on the address of the chairman:

The committee to whom was referred the Chairman's address, find the following recommendation:

"Let the American Pharmaceutical Association take the bold stand, and recommend that the proprietors put the American Pharmaceutical Association plan in force promptly and omit the delay in the submission of it to the retailers for approval."

The Committee, therefore, offer the following resolution:

*Resolved*, that the recommendation of the Chairman of the Commercial Section be approved by this meeting.

CHAS. T. P. FENNEL,
M. W. ALEXANDER,
GEO. W. SLOAN.

Mr. Alexander moved the adoption of the report.

MR. CANNING: I move an amendment, to strike out the words, "omit the delay in the submission to the retailers for approval." That clause weakens the whole resolution.

The amendment was seconded.

MR. TORBERT: It is rather an embarrassing position to appear before this body and argue before it the passage of a resolution which affects a recommendation that I made; but I think in a moment I can show the necessity for the action. This Association appointed members to a tripartite committee. That committee decided that the whole question ought to be referred to the retailers, and if voted upon affirmatively, the plan was to be put into operation. Without such action as here contemplated in Mr. Alexander's resolution, the situation would practically stand before the proprietors that they would not be obliged to put the plan in operation until the retailers of this country had voted upon the question. Now, I want to say this about the objections to such an undertaking. In the first place, it would cost the American Pharmaceutical Association not less than $1,200 to poll that vote. Secondly, it is unnecessary, as it appeared in the discussion of the question the other day in the Commercial Section, that the retailers of this country had expressed themselves on that point through this representative body, appearing here from as many states and territories as there are in this country, and by the resolutions of many of the State Associations. Therefore I hope that, in accordance with the action taken in the Commercial Section, the report will be adopted.

MR. THOMPSON: I would inquire of Mr. Torbert whether the plan proposed and adopted by the tripartite committee did not provide, within itself, that this matter should be submitted to a vote of the retail druggists?

MR. TORBERT: That is the position exactly. I thought I made it clear in my remarks. Of course, that part of the Committee which represents this Association is subject to the action of this Association. The Association created the Committee who are united with members from two other Associations as a Committee on this plan. We now want an expression from this Association, as to the wisdom of that proposed course in view of the expression of the State Associations and this Association on the subject.

MR. ALEXANDER: This resolution passed almost unanimously. This is simply the endorsement of the recommendation of the Chairman of the Commercial Section. We have gone through this whole argument before, and I do not care to open it again.

MR. CANNING: I did not desire to re-open the argument, but I desire to correct Mr. Alexander in his statement. The resolution passed by the Commercial Section does not contain those words that I asked to have stricken out. It asks the proprietors to enforce the plan, but does not contain that element of weakness. Howevèr, I desire to take up no further time in discussing the matter.

MR. TORBERT: I do not want anybody to vote on this under misapprehension. Now, I wish to state that that vote, if Mr. Canning's amendment succeeds, means this and nothing more—that the proprietors will not put the American Pharmaceutical Association plan in force until this Association has expended $1,2co to poll the vote of the retailers of this country.

MR. BASSETT: I want to say a word about this plan. It strikes me that the amendment offered by Mr. Canning is only a stumbling-block in the way of putting the plan in force; and while I do not like to differ with the gentleman, I would like to have it pointed out to me where the Manufacturers' Association ever asked us to poll the retail trade of the United States as to whether they wanted this plan or not. They came to us last year and asked us to formulate a plan. They did not ask us to submit it to the retailers, and never have until they came back this year with it. We formulated that plan. They pruned it to suit themselves, found objections to it, and wanted to throw it back on our hands by asking us to poll the trade of the country as to whether it was wanted or not. I submit that this polling of the trade is merely a stumbling-block in the way of putting the plan in force, and I hope it will not prevail.

Mr. Canning's amendment was thereupon put to a vote, and declared lost.

The adoption of the committee's report having been seconded, was put to a vote and carried.

MR. BASSETT: A request has been made by the Commercial Section for an appropriation to pay the expenses of the delegation to the National Wholesale Druggists' Association, the amount subject to the approval of Council.

MR. CANNING: I think it will be money thrown away. I move that it be referred to the Council.

MR. SEABURY: I hope that opinion will not prevail.

MR. TORBERT: The resolution which Mr. Sheppard offered was more comprehensive than that. I take it that the American Pharmaceutical Association has not appointed a committee to perform any work which, in this instance, is large and comprehensive, and which may bring about most beneficial results, and then to clip its wings and make it powerless to perform any service. If I am right, the resolution offered by Mr. Sheppard was that a sufficient amount of money be appropriated, subject to the approval of the Council, to carry on the work of the Section on Commercial Interests through the committee, and I hope the motion will prevail.

MR. SHEPPARD: Mr. Torbert has stated the motion correctly in its sense.

The motion that sufficient money be appropriated to defray the expenses of the Committee to visit the National Wholesale Druggists' Association, for the purpose stated, the amount subject to the approval of the Council, was then duly seconded and carried.

MR. SHEPPARD: Mr. President, it was in 1887, at the Cincinnati meeting, that this

Association passed a general resolution in relation to prizes. That resolution seemed to lie dead on our Minutes until this year, when it has been revived; but there seems to be some confusion regarding the action of that resolution. In order, therefore, to put the matter into some regular form for future years, I offer the following resolution:

*Resolved*, That the Council be instructed to consider the question of prizes, and report thereon at the next annual meeting; but it is understood that this action shall in no way militate against any arrangements for presentation of prizes next year, if in accord with the vote of the Association in 1887.

The resolution was seconded and unanimously adopted.

Attention being called to the fact that no appropriation had been made for two prizes awarded by the Section on Scientific Papers at this meeting, on motion of Mr. Martin, the amount necessary for paying these prizes was appropriated.

Mr. Alexander read the following:

The Committee appointed by the President upon resolutions of thanks, respectfully report that in view of the generous hospitality extended to the members of the American Pharmaceutical Association at its fortieth annual meeting, held at the Profile House, N. H., it feels that anything it can say will fall far short in expressing the great appreciation of the bounteous hospitality extended by their New England friends, and offers the following resolutions and recommend their adoption:

*Resolved*, That the thanks of the American Pharmaceutical Association are due and hereby tendered to our fellow-pharmacists of New England for their warm reception and generous entertainment extended to the Association; but particularly are we indebted to the Local Secretary, Mr. H. M. Whitney, and his Committee of Entertainment, who have labored so indefatigably, earnestly and intelligently to render the fortieth annual meeting not only the most delightful, but the grandest success in the history of the Association.

*Resolved*, That the thanks of the Association are hereby given to the retiring officers of the Association, who have so faithfully performed the duties of the various offices.

M. W. ALEXANDER,
W. S. THOMPSON,
F. G. RYAN.

MR. ALEXANDER: The Committee acknowledging that they cannot sufficiently express their feelings in a resolution, have asked me to supplement this report by saying a few words in expression of our appreciation of the grand and royal entertainment that has been furnished by our New England friends. I think that the Boston man will be entitled to add another title to his name. You know they have titles already, expressed by the letters, "B. B. B." The old story runs that two men went into Baltimore and registered at a hotel. One signed his name, "Sam Jones, F. R. S.," the other, looking over his shoulder, said, "Allow me, my dear sir, to take you by the hand. You are the first Fellow of the Royal Society I ever met in this country." The man looked at him in amazement, and said, "I'm not a Fellow of the Royal Society." "But," said the other, "You have the title there." "Oh, no; I just came up to Chesapeake Bay to eat oysters, and as this is the place to eat them, I simply signed 'F. R. S.' to indicate that I will take them *fried, raw* or *stewed*." The other man signed his name, "Silas Wentworth, B. B. B." "Now," said the other man, "what does that mean?" "Why, that means '*Boston baked beans*.'" Now, then, I think the Boston men are entitled to have other B's added, so as to have it read, "Boston Baked Beans, Brains and Bounteous Hospitality." (Applause.) That bounteous hospitality this Association has received, and is in the habit of receiving annually, but never before in its history has it been so well entertained.

From the first day of our arrival, our entertainment was carried on. We were taken to Cambridge, and there we breathed the classic air of the old University; then to Concord and Lexington, where we viewed the historical places; then we took the grand sail down the coast and planted our feet upon that hallowed rock where the sturdy Puritans first landed and dedicated the ground to liberty and freedom to worship God. And then we went to the grand monument, to the memory of those heroes who died in defending that liberty at Bunker Hill. At Salem we saw the house where Hawthorne was born, the House of the Seven Gables, Witch Hall, and beheld those pins through which the witches were convicted to be burned. We were then taken across the river and had a drive round the city, viewing their stately business houses and elegant residences, and then started on our way to the Profile House. We were met by the New Hampshire Committee at the beautiful lake Winnipesaukee, sailed across its placid waters, and there was a sumptuous entertainment aboard the boat. We thought we were about through with entertainments, but the other night the New Hampshire people got up the finest entertainment we had ever had—the Aurora Borealis, prepared for our special benefit (applause).

And now, Mr. President, in behalf of the American Pharmaceutical Association, I wish to tender our thanks for all the hospitalities we have received; but I cannot pass over our friend Mr. Whitney, and his local Committee; they have done such wonderful work. Few people but those who have served on such a Committee or as Local Secretary, know the amount of work it requires at his hands. For months and months he is at work, laying out plans, working for the Association; and our friend, Mr. Whitney, turns up to-night as bright as ever, without being at all tired, and says he is glad he is there (applause).

And to the ladies of Boston and surroundings, we are heartily indebted for their hospitality and their combining gracefully together to entertain our ladies; therefore I say that they are entitled to our sincere thanks, and we will give them (applause). I beg to move the adoption of the resolutions read.

The Committee's report and resolutions having been seconded, by a rising vote, were unanimously adopted.

MR. WHITNEY: Allow me to say a word in acknowledgment of what Mr. Alexander has said. I would like to say to the members of the American Pharmaceutical Association who have tendered this vote of thanks, that it has been to me one of the greatest pleasures of my life, and if I have given you any pleasure I certainly shall be very happy. It has been, of course, attended with some fatigue, but I can assure you that the labor, particularly with the assistance of Professor Patch, of Boston, and his able colleagues, has been made comparatively easy. And this wonderful token of appreciation on the part of the ladies—simple though it may be—I never shall forget. I most heartily thank you (applause).

The installation of the newly-elected officers being next in order, Secretary Maisch read the following telegram from the first Vice-President-elect:

PORTSMOUTH, N. H., *July* 18.

Absolutely impossible to come.

A. P. PRESTON.

President Finlay appointed Messrs. Thompson and Alexander a Committee to conduct the officers-elect to the platform. Mr. Remington

being conducted to the chair, President Finlay, addressing the President-elect, said:

"I welcome you to the chair. I know that you will discharge the duties of the office well. I know, too, that your long years of devotion in the interests of this Association entitle you to this, the highest mark of favor and appreciation that it can bestow upon you. I place in your hand the emblem of authority, which you know how to wield. I know, from your history, that a certain implement which resembles it very much in appearance you have wielded in past years with unconquerable skill, and I know for the year to come that the affairs of the Association will be in safe hands."

MR. REMINGTON: Mr. President, and fellow members of the American Pharmaceutical Association: It is twenty-five years since I became a member of this organization. This is my silver wedding, and I think I can say that I never expect to have another silver wedding of this kind that will be as happy. I thoroughly appreciate the remarks made by your President, and called at this time to the highest office that is in your gift, to call together the members of this Association in the city of Chicago, at a time when there shall be gathered together many of our brethren from abroad, and so many members of our own organization, I feel that no light honor has been conferred, and no one can appreciate the responsibilities of this position more than I do. But as I look into your faces to-night, and see that they are gleaming with your confidence, I know that I am surrounded by friends, and I know, dear friends, I am sure, that with your support, with your aid and help, I can give to the duties of this position my very best efforts.

Members of the Association, and Mr. President, I feel most deeply this mark of appreciation, I assure you, and I pledge you my very best efforts to make the forty-first meeting of the American Pharmaceutical Association the most successful meeting that has ever been held (applause).

The President introduced Mr. S. P. Watson, Second Vice-President elect.

MR. WATSON: I most sincerely appreciate the honor, and gratefully acknowledge it. Having perhaps a larger acquaintance among Southern pharmacists than any member of this Association, I fully recognize the fact that the compliment tendered to me is intended largely as a courtesy to them, and shall endeavor to demonstrate by the number of new members I hope to introduce at the next meeting of the American Pharmaceutical Association, that your confidence has not been misplaced.

Mr. Averill, third Vice-President elect, was next introduced.

MR. AVERILL: For the honor you have conferred upon me, I give you my heart-felt thanks. The duties which may devolve upon me in the office of Vice-President I pledge myself to discharge to the best of my ability.

The President introduced Treasurer Sheppard.

MR. SHEPPARD: You would hardly expect a speech from me year after year, as these pleasant times come round. All I can say is, I thank you most heartily for this renewal of your confidence, and that I rejoice with the Association in its strong financial position at the present time, and in the prospect which we have before us of a wonderful increase in membership; for we all know that success always brings success, and that the larger the snow-ball grows the more it will take up at each turn. I hope that your membership will continue to increase, and thereby cause our financial strength to become still greater, each year, until we shall enroll as members of this Association the best of all the

pharmacists of North America. Thanking you once more for this renewal of your confidence, I will only add, that I shall try during the coming year to show by my acts that I well appreciate the honor you have conferred.

Secretary Maisch was introduced by the President.

SECRETARY MAISCH: I think it was a bad practice that was inaugurated some ten years ago by one of our former Presidents, to ask the Permanent Secretary to make a speech annually. I have nothing new to tell you, except, perhaps, since some may not be aware of it, that it was in New England that the office of Permanent Secretary was created, in the year 1865. Since that time we have met several times in New England, with the same incumbent in the Secretary's position that was elected in 1865. Having now re-elected him, it seems that he must have given you some satisfaction; and that is one consolation, in regard to the work that had to be done, the labors that had to be performed, and the vicissitudes met with, particularly in the past. I can only assure you that I shall endeavor to perform the duties at least fully as well as I have done in the past, and I thank you heartily for the renewed expression of your confidence and good-will.

On motion of Mr. Hopp, the resolution of thanks was ordered to be engrossed, framed, and presented to Mr. Whitney.

Mr. Good offered the following resolution, which was seconded and adopted unanimously:

*Resolved*, That the American Pharmaceutical Association desires to record its appreciation of the ethical position taken by the American Medical Association at its last meeting, in its efforts to discourage the use of secret remedies and traffic in nostrums.

MR. TORBERT: Mr. President and Gentlemen: I wish to offer the following resolution:

*Whereas*, The American Pharmaceutical Association has learned, with deep regret, the very serious illness of our brother who has occupied a distinguished position in pharmacy;

*Resolved*, That the American Pharmaceutical Association tender to his family their sincere sympathy, and sincerely trust that the shadow which rests over them and us may be lifted. But if it shall happen that this is the last illness of our brother, I am sure that we shall all feel, to speak in the language of the poet:

"That something's gone which should be nigh,
A loss in all familiar things,
In flower that blooms and bird that sings.
And yet, dear friend, remembering thee,
Am I not richer than of old?
Safe in thy immortality,
What change can reach the wealth I hold?
What chance can mar the pearl and gold
Thy love hath left in trust with me?
And while in life's late afternoon,
  Where cool and long the shadows grow,
I walk to meet the night that soon
  Shall shape and shadow overflow;
I cannot feel that thou art far,
Since near at hand the angels are;
And when the sunset gates unbar,
  Shall I not see thee waiting stand,
And, white against the evening star,
  The welcome of thy beckoning hand?"

On motion of Mr. Alexander, the vote on Mr. Torbert's resolution was taken in silence and standing.

The Permanent Secretary then read the minutes of the last session, which on motion of Mr. Fennel were approved and adopted.

MR. EBERT: I move that we now adjourn, to meet in Chicago, on the third Tuesday in August, 1893, unless otherwise ordered by the Council.

The motion was seconded and carried, and the Association adjourned.

JOHN M. MAISCH,
*Permanent Secretary.*

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# APPENDIX TO THE MINUTES.

After the final adjournment of the Association at its fortieth annual meeting, the newly elected Council held a session and transacted the following business:

FIRST SESSION—PROFILE HOUSE, JULY 18, 10 P. M.

Present—Messrs. Averill, Dohme, Fennel, Good, Maisch, Ramsperger, Remington, Sheppard, Watson and Whelpley. G. W. Kennedy acting as Secretary.

Nominations were made for officers and committees, and the following were duly elected:

J. M. Good, Chairman; H. M. Whitney, Vice-Chairman; G. W. Kennedy, Secretary.

*Committee on Membership:* H. M. Whelpley, Chairman, Andrew P. Preston, Sidney P. Watson, Wm. H. Averill, Henry Biroth, and the Permanent Secretary and Treasurer *ex-officio.*

*Committee on Finance:* Chas. E. Dohme, Chairman, C. F. Goodman and G. Ramsperger.

*Committee on Publication:* Chas. T. P. Fennel, Chairman, A. Conrath, P. C. Candidus, Henry Kraemer, and J. M. Maisch.

*Committee on Centennial Fund:* Jos. P. Remington, Chairman, Chas. E. Dohme, and J. M. Maisch.

*Committee on Transportation:* Thos. F. Main, New York, Chairman; Henry Sharp, Atlanta; S. A. D. Sheppard, Boston; A. E. Ebert, Chicago; W. J. M. Gordon, Cincinnati; Chas. M. Ford, Denver; A. K. Finlay, New Orleans; M. W. Alexander, St. Louis, and Wm. Searby, San Francisco.

Mr. Whelpley presented the following, which was adopted:

In view of the fact that the conditions which will obtain at the time of the holding of our next annual meeting will be unusual and extraordinary, resolved that a Committee of Arrangements, consisting of five members, be appointed.

The Committee was constituted by electing Henry Biroth, Chairman, C. S. N. Hallberg, T. H. Patterson, D. R. Dyche, and H. W. C. Martin.

On motion of Mr. Whelpley, G. W. Kennedy was elected Secretary of the Committee on Membership.

The Council then adjourned.

## REPORT OF THE COMMITTEE ON NATIONAL FORMULARY.*

*To the American Pharmaceutical Association:*

The chairman has the honor to report that early in February of this year he issued a second circular letter to all the members of the Committee, in which he called attention to the importance of communicating to him promptly their criticisms on the present Formulary, as well as any suggestions and additions that they may find it proper to make with a view to its early revision. The responses to this circular letter came in so slowly and sparingly, that for a time he felt quite discouraged, and it was not until he sent out a final admonition, in May, that replies were secured from a majority of the members of the Committee. A considerable number of these replies were simply explanations why no assistance had been given; the smaller number contained suggestions and criticisms, which have been systematically arranged, and constitute Part II. of the "Epitome of Criticisms on the National Formulary" following. Part I. of this "Epitome" embraces the abstracts of criticisms that have been communicated to the journals since the publication of the Formulary; while Part III. gives the results of an examination of the typical specimens of N. F. preparations, exhibited at Detroit, in 1888, and since then in possession of the Chairman. This division into three parts was made because the observations and criticisms that have reached the chairman, though all tending to the same end, were made under different conditions: those embraced by Part I. being spontaneous contributions, voluntarily communicated to the pharmaceutical press; those under Part II. are solicited contributions; and those under Part III. are confined to the character and stability of certain typical specimens. The observations under each of these classes have their specific value, and will doubtless prove useful as a basis upon which to make a revision of the Formulary.

It would consume time unnecessarily to read the "Epitome," as here presented, before the Association; but it may be well to submit a brief review of the impressions conveyed to the chairman by the criticisms and suggestions embraced by it. The nature of these admits of the discussion of the subject under four headings, viz.: Popularization and Acceptance of the Formulary; Corrections; Additions; Eliminations.

*Popularization and Acceptance of the Formulary.*—The Formulary has, as a whole, proven an acceptable aid to pharmacists for making many of the preparations in popular demand, and as a convenient work of reference for formulas of preparations that have been official in the past, or have become obsolete, and for which the demand is ephemeral. Nevertheless, it is not used nearly as extensively, nor adhered to as closely, as it deserves, taking into account only the character of its excellency, and leaving out all ethical considerations. The causes that determine this lukewarmness are

* See minutes of the Second Session, page 41.

doubtless many, but most prominent among them are the successful efforts of manufacturers of specialties to introduce their goods to the favorable notice of physicians, and the difficulty to enlist the physicians into sympathy with the objects aimed at by the Formulary. For, while physicians, here and there, have taken kindly to the preparations of the Formulary, it is apparent that *as a class* they do not seem to be aware of its existence, and in their prescriptions they continue to designate the preparations of special manufacturers with as much disregard for the dispenser as in the past. It is clear that without the active support of practitioners of medicine, the Formulary must fail in its most important objects—uniformity in formula for certain non-official preparations, and displacement of proprietary specialties. Several suggestions are made in this direction, such as the free and liberal distribution of the Formulary, or of a commentary to it, among physicians, the presentation of samples of N F. Preparations to them, etc.; but all such efforts must come to naught, or redound at best only to the benefit of individuals, if the Formulary does not receive the same recognition by the National, State, and Local Medical Associations that is accorded it by the corresponding Pharmaceutical Associations. This Association should therefore persist in its earnest efforts, and should secure the active co-operation of all State and Local Pharmaceutical Associations, to obtain the recognition of its Formulary by the Medical Associations throughout the land. Individual physicians could then be approached with greater freedom and greater assurance of success than has heretofore been possible.

*Corrections of the Formulary.*—Among the general objections to the Formulary, that which finds voice most frequently is the one that too many of the preparations are dependent upon each other; that is to say, that two, three or more preparations must be made before the one desired can be compounded. A simplification of the formulas is doubtless a desideratum, and can in many cases be readily accomplished; but it must not be forgotten that to make certain preparations conveniently, and particularly extemporaneously, it is necessary to have the components in a form in which they are suitable for simple admixture. This applies cogently to elixirs, for which one or more simple aromatic vehicles are paramountly necessary for convenient dispensing. At the same time, it cannot be denied that the number of such basic preparations is larger than convenient, and possibly larger than necessary. Thus, the Committee on National Formulary of the New York State Pharmaceutical Association calls attention to the fact that it had originally recommended only five basic preparations for elixirs, but that the National Formulary requires thirteen, and it earnestly recommends a cutting down of this number. Indeed, Mr. G. H. Chas. Klie, who has communicated a lengthy criticism on various preparations, advocates the reduction, if possible, to a single simple elixir for all, or almost all elixirs, and expresses the opinion that this, connected with

a concise formula, not necessitating reference to other formulas, and allowing the preparation of almost any elixir extemporaneously, would popularize the Formulary so much, that it would introduce itself everywhere. This view of Mr. Klie is endorsed by the experience of the chairman, who, as early as 1872, published a series of formulas for elixirs and wines, in which this simplicity was aimed at, and which was acceptably received by many pharmacists. The little pamphlet, which was liberally distributed during 1872–1874, is doubtless unknown to many of our profession, and has been forgotten by others, and would not be alluded to now if the chairman did not think that some such simple plan as that outlined in the pamphlet would go far towards meeting the objections made to the National Formulary. He may therefore be pardoned for quoting from it the following:

"In constructing formulas for these elixirs and wines I have attempted to simplify them as much as possible, in order that such as are seldom demanded may be prepared as wanted. With this in view I prepared a *simple elixir*, an *elixir of calisaya bark*, a *wine flavored with orange*, various *solutions of essential oils*, and *cochineal coloring;* all of which I usually keep in stock, and prepare by their aid such preparations as may happen to be in demand."

From the criticisms on the individual elixirs it develops that, as a rule, the least objection is made to those having *elixir aromaticum* as a base, whilst those made with *elixir adjuvans* are the ones mostly complained of. This experience of individuals is furthermore supported by the examination of typical specimens (Part III.), in which it was found that the preparations made with aromatic elixir were as a rule clear and in good condition, whilst those made with the adjuvant elixir were as a rule turbid and unsightly.

The criticisms on other preparations are not of sufficient importance to require attention here, but it may be of interest to briefly mention the keeping qualities of the typical preparations examined by the chairman, as well as those reported upon by Prof. A. B. Stevens, who had prepared a complete series of N. F. elixirs, solutions and powders. After keeping them nearly a year he found only seven preparations that had undergone material change, all others being in good condition. These seven were the following: 42. Elixir of Cinchona; 63. Elixir of Phosphate of Iron, Quinine and Strychnine; 80. Elixir of Malt and Iron; 99. Compound Elixir of Blackberry; 214. Liquid Extract of Liquorice; 363. Syrup of Citro-Iodide of Iron; and 369. Syrup of Liquorice.

This experience of Prof. Stevens certainly speaks well for the preparations of the Formulary, and in contrast with the observations respecting the typical preparations is of specific value, since the latter represents the change that they are liable to undergo after a prolonged period (4 years), longer than that during which they would ordinarily be kept; whereas

Prof. Stevens' observations apply to preparations that had been kept about as long as they are liable to be kept in stock in the ordinary course of business.

Considering the time during which the typical preparations were kept, their condition must be regarded, as a rule, satisfactory. Most of the elixirs were in as good condition apparently as when first made; others were unsightly because of their special composition, and, as before mentioned, they generally contained adjuvant elixir as a base. The fluid extracts were nearly all found free from material change, and it was so with tinctures, liniments and solutions. Of the syrups some few have changed materially; others are perfectly preserved. The most satisfactory preparations, in some respects, were the effervescents. These were represented by two forms, the powdery and the granular. In nearly every case the granules were separate, while the powders, in most instances, were more or less caked, though friable. It was expected, of course, that the granular sort would be superior in effervescing properties, but the contrary was the case, except in one or two instances, in which the granular preparation seemed to effervesce more freely than the powder. In all others the powder was equal, and in some cases superior in effervescent qualities to the granular. Finally, the wines had stood the test of time only fairly well, most of them showing precipitates, while several appeared to have undergone other unfavorable changes.

*Additions to the Formulary.*—The additions proposed are not as numerous as one might be led to suppose from the clamor in some quarters for an early revision of the Formulary. They represent nearly all classes of preparations, but the majority of them are intended to replace certain trade-marked specialties that are in the popular demand. Among those proposed are some for which formulas are now given in the Formulary, but which have escaped the attention of the proposer because there is no indication given in the N. F. title that the preparation is intended to replace such trade-named specialty. Ethical reasons, among others, probably, and very properly, prevented the National Formulary Committee from indicating these by their trade-names; but to render the formulas useful, some indication of their connection with the specialty they represent should be given with the title. It might be well, perhaps, to say under the title: "This preparation is intended to replace a trade-named specialty, advertised as an Antiseptic, an Emmenagogue, an Anti-rheumatic," etc., etc., as the case may be. Or, possibly, the Committee will find some other suitable way to more clearly indicate the purpose for which the preparation has been introduced.

Among other additions, it is recommended that formulas be given for the troches in popular demand, and that the number of effervescent salts be augmented. There is a way in which the last named can be made extemporaneously and of any desired combination, if only physicians can be

led to recognize that the granular condition is not essential to the efficiency of these preparations. The method which has been used in a limited way by the Chairman, is one that will secure an accurate and uniformly reliable effervescent product, and may be briefly described as follows: Two basic powders are prepared—one containing an alkaline bicarbonate, the other a vegetable acid, both in suitable admixtures with cane-sugar. The quantity of alkali and of acid are in each of these basic powders so proportioned that when equal weights of them are mixed, they are in proper proportion to secure a neutral solution. Then, by adding the medicinal ingredient to the one or other of these basic powders (according to the nature of the addition), and mixing this with a corresponding quantity of the opposite basic powder, an efficient effervescent powder is conveniently and rapidly obtained, and one against which there can be no possible objection except that it is not granular.

Among additions that may have to be introduced and that have not been proposed, tablet triturates, and particularly those intended for hypodermic use, should not be omitted. It is very desirable that the base for hypodermic tablets be defined, and that general methods be given suitable for the different medicinal ingredients that are likely to be employed.

*Eliminations from the Formulary.*—Very few eliminations have been proposed, and these will doubtless receive the attention of the Committee. The elimination of preparations that have become official will as a matter of course be effected, but the Chairman is not in favor of any other eliminations, unless it be clearly shown that the preparation is absolutely faulty and that the fault cannot be remedied. Even the objectionable basic preparations for elixirs need not be eliminated from the Formulary, it being only necessary to eliminate them from the formulas in which they are now used.

In closing this review the Chairman desires to call attention to the necessity of a meeting of the Committee, so that a plan for expeditious work may be determined, and that organizations into sub-committees may be effected. The most important subjects to be assigned to sub-committees are:

1. The correction of formulas in conformity with suggestions that have been or may be made, and on the basis of renewed experiment.

2. The addition of such preparations as may prove desirable.

3. The elimination of preparations and medicinal agents that shall have been embodied in the U. S. P. 1890, or that may have proven absolutely worthless or undesirable.

C. LEWIS DIEHL, *Chairman.*

## EPITOME OF CRITICISMS ON NATIONAL FORMULARY.

PART I.—*Abstracts from the Journals (1888–1891), made by Mr. G. H. Chas. Klie. Arranged systematically by the Chairman.*

A. *Method for Popularizing the National Formulary.*—E. A. Craighill, M. D. (Pharm. Era, March, 1891), answers the question, "Should the National Formulary be Generally Adopted?" affirmatively.

To get the National Formulary into the hands of all physicians, he suggests to issue an edition of the work for gratuitous distribution.

B. *Commentary to the Formulary.*—George M. Beringer (Drugg. Circ., February, 1889), thinks a commentary to the National Formulary would make it desirable to the physician.

C. *Introduction of the Formulary.*—J. M. Love (Meyer Bros. Drugg., June, 1889,) has introduced the National Formulary in Jackson Co., Mo., in which Kansas City is located, by the Retail Druggists Association making a display of the National Formulary preparations before the Jackson County Medical Society. The physicians were very much pleased, and adopted a motion endorsing the National Formulary, granting the druggists the privilege and right to use the preparations of the National Formulary in filling their prescriptions.

D. *Status of the Formulary.*—Frank Edel (Phar. Era, May, 1890), pronounces the formulæ on the whole good, and wishes a few only omitted, many new formulæ added, and some radically changed.

E. *Profitable Use of the Formulary.*—Francis Hemm (Drugg. Circ., Sept., 1891), in a report, as Chairman of the Committee on National Formulary of the Missouri Pharmaceutical Association, gives a list of twenty-three preparations, costing $14.50, which will enable the pharmacist to make most of the wines, elixirs, syrups, etc. He shows why the National Formulary preparations are the best and most profitable to the retail druggist, and advises all pharmacists who are determined not to prepare their elixirs, etc., to at least insist on having the National Formulary preparations from their dealers.

F. *Utility of the Formulary.*—E. F. Allan (Western Drugg., Jan., 1890), answers in reply to question, "How Can the National Formulary be made Most Useful to the Pharmacist?"

Let him adopt the plan of manufacturers, of showing samples. Let him send a few select samples of the National Formulary preparations to each of his physicians, drawing attention to the Formulary and that the preparations have superior merits, because they are carefully prepared and are uniform in strength. When the physician has been interested, present him with an epitome of the Formulary.

G. *Value of the Formulary as a Test for Certain Combinations.*—Editorial in Pharm. Era, July, 1889. The Formulary furnishing precise formulæ, objection against combination of pepsin with bismuth salts and iron

salts can be conclusively tried. The National Formulary exerts a helpful regulating influence on this class of remedies.

H. *Use of the Formulary as a Standard and Text-Book.*—Editorial in *Western Druggist* (April, 1890). The National Formulary is used as a text-book in a large number of colleges of pharmacy. Many manufacturers who formerly cast reflections on the work, now advertise a full line of preparations.

I. *Objections to the Formulary.*—Francis Hemm (*Pharm. Era*, August, 1891,) replies to three objections to the National Formulary.

Objection 1. The formulæ are too complicated, often requiring the making of three or four preparations before being enabled to prepare the one needed.

Answer. By investing $20.00 for material, with the ordinary line of apparatus found in every well appointed drug store, a complete line of basic preparations can be made, to compound any of the wines, elixirs, syrups, emulsions, etc., at a few minutes' notice.

Objection 2. The work is impracticable because we have not the required facilities, apparatus and ingredients.

Answer. Every drug store deserving the name has all the simple apparatus on hand which are required.

Objection 3. This class says, we will introduce the National Formulary to our physicians, if you will inform us of what house we can obtain the preparations, or at least the basic preparations.

Answer. It will put money into the druggist's pockets to make these preparations himself, and make him a better druggist into the bargain.

K. *Objection to Lengthy Titles.*—Geo. M. Beringer (Drugg. Circ., January, 1889). In many instances the titles adopted for preparations are too lengthy.

L. *Elixirs.*—Committee on National Formulary, N. Y. State Pharm. Assoc. (Drugg. Circ., Aug. 1889). The basic preparations for elixirs which this committee had recommended to the Association at a former meeting were five; the National Formulary requires thirteen. The committee recommends a cutting down of this number.

25. *Elixir Adjuvans.*—Frank Edel (Phar. Era, May, 1890) wants Liquorice reduced one half and Wild Cherry omitted.

26 A. *Elixir Ammonii Bromidi.*—Frank Edel (Phar. Era, Aug., 1889) recommends the omission of Citric Acid, because the acid precipitates the glycyrrhizin contained in the Adjuvant Elixir.

Same recommendation for all the balance of the *Elixirs of Bromides.*

26 B. *Elixir Ammonii Bromidi.*—Frank Edel (Phar. Era, May, 1890). Make the same as Elix. Valer. Ammonia (see 27 A).

27 A. *Elixir Ammonii Valerianatis.*—Frank Edel (Phar. Era, May, 1890). This elixir should be made with Aromatic Elixir and colored red.

27 B. *Elixir Ammonii Valerianatis.*—J. M. Anderson (Meyer Bros.' Druggist, Jan., 1891), in his report as Chairman of Com. on Nat. Form. Arkansas Pharm. Assoc., says it wants more color added to make it a deeper red.

31. *Elixir Aromaticum.*—J. M. Anderson (Meyer Bros.' Druggist, Jan., 1891), recommends the substitution of the U. S. P. Elixir Aurantii for it, or, at least, to include the formula in the Formulary.

40. *Elixir Catharticum Compositum.*—Frank Edel (Meyer Bros.' Drugg., Aug., 1889). Should be omitted because it is nasty. The author reiterates this opinion in a subsequent paper (Pharm. Era, May, 1890).

54 A. *Elixir Eriodictyi Aromaticum.*—J. M. Anderson (Meyer Bros.' Drugg., Jan., 1891) says this elixir is superfluous and should be omitted.

54 B. *Elixir Eriodictyi Aromaticum.* — Frank Edel (Meyer Bros.' Drugg., Aug., 1889) prefers the ground drug, as follows:

Take of

| | |
|---|---|
| Ground yerba santa | 6 ounces. |
| Cochineal | 1 drop. |
| Oil of cloves | 30 drops. |
| " orange | 40 " |
| " cinnamon | 30 " |
| Liquor potassa | 1 ounce. |
| Water, sufficient quantity. | |
| Alcohol, sufficient quantity. | |
| Glycerin, sufficient quantity. | |
| Sugar | 4 pounds. |

Rub the oils, cochineal and yerba santa thoroughly together; moisten with one part of alcohol, four parts of water, and one part of glycerin. Pack loosely in a percolator and add menstruum as above, to which one-half ounce liquor potassa has been added, until it begins to drop, then close the percolator and allow to macerate for twelve hours, then percolate, being careful to turn back till perfectly clear and percolate to five pints; add half an ounce liquor potassa and mix. Then add the sugar and dissolve by agitation, finally add one pint of alcohol.

54 C. *Elixir Eriodictyi Aromaticum.*—Frank Edel (Pharm. Era, May, 1890) wants the following formula substituted for the N. F. formula.

Take:

| | |
|---|---|
| Ground yerba santa | 6 ounces. |
| " orange peel | 2 " |
| Liquor potassa | 1 " |
| Oil of cloves | 30 drops. |
| " cinnamon | 30 " |
| " caraway | 10 " |
| " coriander | 10 " |
| Tinct. cardamom com | 1 ounce. |
| Alcohol, | |
| Glycerin, | |
| Water, a sufficient quantity. | |
| Sugar | 4 lbs. |

Rub the oils and tinctures with the ground drugs, moisten with a mixture of one part of alcohol, one of glycerin, and three of water. Pack in a percolator and percolate (with menstruum as above, to which one half per cent. liq. potass. has been added) to five pounds, pouring back until it comes through clear. Add the balance of the liq. potass. and one pint of alcohol, and dissolve the sugar by agitation.

65 A. *Elixir Ferri, Quininæ et Strychninæ.*—Geo. M. Beringer. (Drugg. Circ., Jan., 1889) says the substitution of the tincture of citro-chloride of iron for the pyrophosphate in this elixir is not advisable.

65 B. *Elixir Ferri, Quininæ et Strychninæ.*—A. Tscheppe (Amer. Drugg., Feb., 1889). This elixir made with Citro-Chloride of Iron has these advantages: It keeps a bright green color an indefinite time and never spoils on standing. The citro-chloride of iron admits of a wide range in its reaction without losing its equilibrium.

65 C. *Elixir Ferri, Quininæ et Strychninæ.*—Frank Edel (Meyer Bros.' Drugg., Aug., 1889). This elixir made with the Tincture of Citro-Chloride of Iron is a handsome preparation and should be widely used.

65 D. *Elixir Ferri, Quininæ et Strychninæ.*—Frank Edel (Phar. Era, May, 1890), observes that the formula for this elixir is not satisfactory (65 C). A precipitate is deposited. The following formula furnishes a stable elixir:

| | | | |
|---|---|---|---|
| ℞. | Sulph. quinine | 128 | grs. |
| | Sulph. strychnine | 1 ¼ | " |
| | Phosphate Iron U. S. P. | 256 | " |
| | Alcohol | 2 | ozs. |
| | Glycerin | 2 | " |
| | Syrup | 2 | " |
| | Aromatic elixir | suf. quant. | |

Dissolve the strychnine in the alcohol and add the quinine. Mix the syrup and glycerin and heat. Add to the alcohol the solution and continue heat (carefully) until solution is effected. Add enough aromatic elixir to make 14 ounces. Dissolve the iron salt in the water by heat and add to elixir: mix thoroughly, and after allowing to stand several hours, filter.

*The Elixir Citro-Chloride of Iron, Quinine and Strychnine* is an elegant preparation when fresh, but deposits a precipitate after a time.

65 E. *Elixir Ferri, Quininæ et Strychninæ.*—J. M. Anderson (Meyer Bros. Drugg., Jan., 1891) recommends the phosphate or pyrophosphate of iron instead of the citro-chloride of iron. (See 65 D).

71 A. *Elixir Glycyrrhizæ Aromaticum.*—Frank Edel (Meyer Bros. Drugg., Aug., 1889) recommends ground Russian liquorice root. Rub the oils with same, macerate for twelve hours with aromatic elixir to which one drachm of aqua ammoniæ has been added, then percolate one pint.

71 B. *Elixir Glycyrrhizæ Aromaticum.*—Frank Edel (Pharm. Era,

May, 1890) recommends two drachms of ammoniated glycyrrhizin to the pint instead of the liquorice. (See 71 A).

91. *Elixir Potassii Bromidi.*—Frank Edel (Pharm. Era, May, 1890) recommends this to be modified the same as Elixir Valer. Ammon. (see 27 A.)

93. *Elixir Quininæ et Phosphatum Compositum.*—Frank Edel (Pharm. Era, May, 1890). This elixir precipitates the iron.

96. *Elixir Rhamni Purshianæ Compositum.*—Frank Edel (Meyer Bros. Drugg., Aug., 1889). Gardner's formula furnishes a nice and pleasant tasting elixir, as follows:

| | | |
|---|---|---|
| Fluid extract rhubarb | 3 | ounces. |
| " " senna | 2 | " |
| " " dandelion | 3 | " |
| " " buckthorn | 1½ | " |
| " " ginger | 2 | drams. |
| Phosphate of sodium | 4 | ounces. |
| Rochelle salt | 3 | " |
| Tincture of lemon peel (fresh) | 3 | " |
| Simple syrup | 22½ | " |
| Tincture of orange peel | 3 | " |
| Water, sufficient quantity to make | 100 | ounces. |

103. *Elixir Stillingiæ Compositum.*—Frank Edel (Meyer Bros. Drugg., Sept., 1889) recommends the ground drugs as follows:

Take of:

| | | |
|---|---|---|
| Stillingia, ground | 4 | ounces. |
| Iris | 2 | " |
| Corydalis, ground | 4 | " |
| Sambucus, " | 2 | " |
| Chimaphila, " | 2 | " |
| Coriander, " | 1 | " |
| Xanthoxylum berries, ground | 1 | " |

Mix thoroughly with aromatic elixir, let macerate over night, and then percolate with aromatic elixir to make four pints.

105 A. *Elixir Taraxaci Compositum.*—Frank -Edel (Meyer Bros. Drugg., Sept., 1889) recommends the drugs properly ground, and then percolate with one part of alcohol and two parts of water to one pint. To finish it add 8 fl. oz. of syrup.

105 B. *Elixir Taraxaci Compositum.*—Frank Edel (Pharm. Era, May, 1890) wants it made of lighter specific gravity.

114. *Emulsio Olei Morrhuæ.*—Committee on National Formulary, New York State Pharmaceutical Association (Drug. Circ., Aug., 1889). One uniform formula for emulsion of cod-liver oil is preferable to six (see 266).

124. *Extracta Fluida.*—Committee on National Formulary, New York State Pharmaceutical Association (Drugg. Circ., Aug., 1889), recommends the use of finer powders for the fluid extracts in the Formulary.

193. *Lac Fermentatum.*—A. Tscheppe (Amer. Drugg., Feb., 1889). In place of preparing kumyss with sweet milk, and waiting until it turns sour, the casein may be precipitated at once by the addition of one-third of ready kumyss to fresh milk. Yeast is not necessary, but sugar must be added to produce enough carbonic acid gas to cause effervescence.

Kumyss may also be made from sour milk, freed from its crust of cream, by breaking up the gelatinous mass by vigorous concussion, and causing alcoholic fermentation by addition of sugar and yeast. This preparation would be nearly devoid of cream, but a portion may be brought in by the addition of sweet milk.

Kephir kumyss is prepared by adding active kephir grains to milk, preferably kept at a temperature between 70° and 80° F. until the effect of fermentation becomes apparent by the rising of the grains to the surface. The grains may then be strained off, and the milk, which now contains enough yeast-cells to insure the continuance of the fermentation, left to itself in well-corked bottles.

202 A. *Liquor Acidi Phosphorici Compositus.*—Geo. M. Beringer (Drugg. Circ., Jan., 1889) recommends the adoption of Dr. Wm. Pepper's formula for Liquor Acidi Phosphorici Compositus.

202 B. *Liquor Acidi Phosphorici Compositus.*—A. Tscheppe (Amer. Drugg., Feb., 1889). The formula as given in the N. F. was taken, because it secures a product similar to a proprietary article which for a number of years has been in universal use throughout the United States.

This preparation when made from bone-ash does not lack definiteness more than a preparation made from separate ingredients, because bones as a product of nature do not vary to such an extent as the separate ingredients do, as found in the shops, and from which the preparation might be compounded.

202 C. *Liquor Acidi Phosphorici Compositus.*—Frank Edel (Phar. Era, May, 1890) recommends Pepper's formula as given in Remington's Pharmacy.

205. *Liquor Ammonii Acetatis Concentratus.*—Geo. Beringer (Drugg. Circ., Jan., 1889) recommends its elimination.

206. *Liquor Ammonii Citratis Fortior.*—Geo. M. Beringer (Drugg. Circ., Jan., 1889) recommends its elimination.

212. *Liquor Cupri Alkalinus.*—Geo. M. Beringer (Drugg. Circ., Jan., 1889). "Fehling's" solution should be eliminated.

213. *Liquor Electropœicus.*—Geo. M. Beringer (Drugg. Circ., Jan., 1889). "Battery fluid" should be eliminated.

233. *Liquor Seriparus.*—Geo. M. Beringer (Drugg. Circ., Jan., 1889). "Liquid Rennet" should be eliminated.

241. *Liquor Zinci et Ferri Compositus.*—A. Tscheppe (Amer. Drugg., Feb., 1889) recommends the following formula to be substituted for Formula No. 241:

| | |
|---|---|
| Sulphate of zinc | 16 tr. oz. |
| " " iron | 16 " " |
| " " copper | 5 " " |
| Naphthol | 20 grs. |
| Oil of thyme | 60 min. |
| Diluted hypophosphorous acid | 120 " |
| Water, enough to make | 5 pints. |

The editor of the American Druggist adds: The title would have to be modified, so as to correspond to the new ingredient. We would suggest Liquor Zinci, Ferri et Cupri Compositus, or simply Liquor Deodorans.

250. *Mistura Camphoræ Acida.*—Geo. M. Beringer (Drugg. Circ., Jan. 1889). Substitute the original formula for Hope's Camphor Mixture. The original formula calls for Nitrous, not Nitric Acid.

253 A. *Mistura Chloral et Potassii Bromidi Composita.*—Drugg. Circ., April, 1889, (1890?) points out a mistake in formula No. 253. In the directions for compounding, it says, "Dissolve the Chloral and Bromide of Potassium in 12 fl.gr. of water." This should read, "in enough water to make twelve ounces."

The editor comments on this by saying the statement of the writer has been verified by experiment.

253 B. *Mistura Chloral et Potassii Bromidi Composita.*—Com. on National Formulary, N. Y. State Phar. Assoc. (Drugg. Circ., Aug., 1889), recommends that the formula for this preparation be improved.

254 A. *Mistura Chloroformi et Opii.*—Com. on National Formulary, N. Y. State Phar. Assoc. (Drugg. Circ., Aug., 1889), recommends that formula No. 254 be improved, and recommends the following as a substitute:

| | |
|---|---|
| Purified chloroform | 2 fl. oz. |
| Oil of peppermint | 16 minims. |
| Tinct. Indian cannabis | 2 fl. ozs. |
| Deodorized tinct. opium | 2 ¾ fl. ozs. |
| Fluid extract belladonna | 128 minims. |
| Tinct. capsicum | 1 fl. oz. |
| Glycerin | 3 fl. ozs. |
| Alcohol sufficient to make | 16 fl. ozs. |

254 B. *Mistura Chloroformi et Opii.*—Frank Edel (Phar. Era, May, 1890) recommends Chandler's formula instead of that of the N. F.

256 No. 2. *Mistura Copaibæ Composita.*—J. M. Anderson (Meyer Bros. Drugg., Jan., 1891) recommends the following formula in place of that given in the N. F. for "Chapman's Mixture:"

| | | | |
|---|---|---|---|
| ℞. | Balsam copaiva | 4 | fl. ozs. |
| | Spir. nitrous ether | 4 | " |
| | Tinct. opium | ½ | " |
| | " lavender comp. | 1 | " |
| | Gum acacia | 1 ½ | " |
| | Sugar | 1 | " |
| | Water, suf. quant. to make | 16 | " |

Make an emulsion.

266. *Mucilago Chondri.*—J. M. Anderson (Meyer Bros. Drugg., Jan. 1891) recommends mucilage of Irish moss as the best emulsifier of cod Liver Oil.

279 A. *Pepsinum.*—Geo. M. Beringer (Drugg., Circ., Jan. 1889) recommends Scheffer's process for making pepsin as the best, and ought to be given in the Formulary.

279 B. *Pepsinum.*—A. Tscheppe (Amer. Drugg., Feb. 1889). The dried coating of mucus scraped off the stomach furnishes the best pepsin. Clarification is difficult, but the filter press and paper-pulp may overcome the difficulty.

279 C. *Pepsium.*—Frank Edel (Phar. Era, May, 1890) wants a formula for its preparation to be given in the N. F.

279 D. *Pepsinum.*—Com. on National Formulary, N. Y. State Phar. Assoc. (Drugg. Circ., Aug., 1889), recommends a pepsin of 1000 digestive power as the standard.

279 E. *Pepsinum.*—J. M. Anderson (Meyer Bros. Drugg., Jan., 1891) recommends to place the strength at 1000.

347. *Spongia Compressa.*—Geo. M. Beringer (Drugg. Circ., Jan., 1889). Should be eliminated.

348. *Spongia Decolorata.*—Geo. M. Beringer (Drugg. Circ., Jan., 1889). Should be eliminated.

M. *Syrups.*—Glycerin as a preservative. Frank Edel (Meyer Bros. Drugg., Sept., 1889) recommends the addition of glycerin to

| | |
|---|---|
| Syrup of iodide of Iron, | (363?). |
| Syrup of Iodide of Calcium | (357). |
| Syrup of Hypophosphites | (370?). |
| Compound Syrup of Stillingia | (384). |
| Compound Syrup of Aralia | (351?). |
| Compound Syrup of Rumex | (Not in Formulary). |
| Compound Syrup of Horehound | (Not in Formulary). |

350 A. *Syrupus Acidi Hydriodici Decolor.*—Geo. M. Beringer (Drugg. Circ., Jan., 1889). This formula, being official, should not be given.*

350 B. *Syrupus Acidi Hydriodici Decolorata.*—Frank Edel (Meyer Bros. Drugg., Sept., 1889). Filter the acid as made by the formula into two fluidounces of glycerin, mix thoroughly, and add enough simple syrup to make sixteen fluidounces.

350 C. *Syrupus Acidi Hydriodici Decolorata.*—Frank Edel (Phar. Era, May, 1890) recommends England's formula as more stable (than the N. F. formula?)

361 A. *Syrupus Eriodictyi Aromaticus.*—Frank Edel (Phar. Era, May,

*The author also mentions "Syrupus Tolutanus" and "Mistura Amygdalæ" as official preparations that should not be given in the National Formulary; but neither of these is embraced by the last named work.—C. L. D.

1890). Present formula does not yield a nice, clean product. Proposes the following:

| | |
|---|---|
| Fl. extr. yerba santa | ½ ounce. |
| Fl. extr. cardamom comp | 1 drachm. |
| Oil of cloves | 3 drops. |
| Oil of cassia | 5 " |
| Liquor potassa | 180 min. |
| Water | 2 ounces. |
| Alcohol | 1 " |
| Glycerin | 2 " |
| Talcum, sufficient quantity. | |
| Simple syrup, sufficient quantity to make | 16 " |

Mix the fluid extracts and liquor potassa and alcohol, then add the oils and water, rub up with talcum, and filter till clear, then add two ounces of glycerin to the filtrate and mix thoroughly; add enough simple syrup to make sixteen ounces.

360 B. *Syrupus Eriodictyi Aromaticus.*—J. M. Anderson (Meyer Bros. Drugg., Jan., 1891) recommends that 11 troy grains of sugar instead of 13 to each 16 fluidounces of syrup be used, and double the quantity of fluid extract and liquor potassa.

363. *Syrupus Ferri Citro-Iodidi.*—Geo. M. Beringer (Drugg. Circ., Jan., 1889) pronounces tasteless syrup of iodide of iron a "chemical humbug."

370. *Syrupus Hypophosphitum Compositus.*—Frank Edel (Pharm. Era, May, 1890) recommends the following formula:

| | |
|---|---|
| ℞. Sodium hypophosphite | 256 grains. |
| Calcium | 189 " |
| Potassium | 128 " |
| Strychnine | 1 " |
| Quinine alkaloid | 60 " |
| Sulphate iron | 90 " |
| Manganese hypophosphite | 64 " |
| Hypophosphorous acid, sufficient quantity. | |
| Sugar | 14 ounces. |
| Water, sufficient quantity. | |
| Dilute phosphoric acid | 2 drachms. |

Dissolve the sodium salt, potassium salt and 128 grains of the calcium salt in 4 ounces of water, and filter; dissolve the strychnine in ½ oz. of water, add the quinine and 1 oz. of water, dissolve by aid of the hypophosphorous acid, filter into previous filtrates. Then dissolve 90 grs. of sulphate of iron in 1 oz. of water and 2 drs. of dilute phosphoric acid. Rub 61 grs. of hypophosphite of calcium to a fine powder in a mortar, add the solution of iron, stir three or four minutes, and filter into other mixed filtrates; wash the residue with one-half ounce of water. Then dissolve

6

the sugar in the filtrate by agitation or cold percolation. Add simple syrup, if necessary to make 16 ounces.

376. *Syrupus Pectoralis.*—Geo. M. Beringer (Drugg. Circ., Jan., 1889) recommends Dr. Jackson's original formula for Jackson's Pectoral Syrup.

377. *Syrupus Phosphatum Compositus.*—Frank Edel (Phar. Era, May, 1890). The formula furnishes an elegant preparation when fresh. Upon standing a copious precipitate is deposited. Experiments ought to be made to overcome this.

384. *Syrupus Stillingiæ Compositus.* — Frank Edel (Meyer Bros. Drugg., Sept., 1889) recommends the formula given in Oldberg's Unofficial Pharmacopœia with one-half the glycerin there ordered.

385 A. *Talcum Purificatum.*—Com. on Nat. Form., N. Y. State Phar. Assoc. (Drugg. Circ., Aug., 1889). In the opinion of the Committee, Talcum ought not to be used in any elixir.

385 B. *Talcum Purificatum.*—J. M. Anderson (Meyer Bros. Drugg., Jan., 1891) denounces the use of talcum or any similar substance in the preparation of fluid extracts.

397. *Tinctura Ferri Citro-Chloridi.*—Geo. M. Beringer (Drugg. Circ., Jan., 1889) calls this a "chemical humbug."

401. *Tinctura Iodi Decolorata.*—Geo. M. Beringer (Drugg. Circ., Jan., 1889) calls this a "chemical humbug."

417. *Tinctura Vanillini Composita.* — Geo. M. Beringer (Drugg., Circ., Jan., 1889) condemns the formula for Compound Tincture of Vanillin.

427. *Vinum Carnis et Ferri.*—J. M. Anderson (Meyer Bros. Drugg., Jan., 1891) recommends the addition of one ounce of sugar, and flavor of the peel of one fresh, sweet orange to each pint. Detannate the sherry wine with fresh, sweet milk.

### ADDITIONS PROPOSED.

N. *Effervescent Salts.*—Frank Edel (Phar. Era, May, 1890). Present Formulæ good. Wants them extended.

O: *Elixir Helonias Comp.*—Frank Edel (Phar. Era, May, 1890). Ought to be added.

P. *Oleates.*—Frank Edel (Phar. Era, May, 1890). Add Oleate of Copper, Oleate of Iron, Oleate of Bismuth, and the whole line in general use.

Q. *Eclectic Syrups.*—Frank Edel (Meyer Bros. Drugg., Sep., 1889) wants eclectic syrups added. Proposes the following formula for Eclectic Syrups:

Take enough properly ground and mixed drugs to make one-half gallon of the finished syrup, moisten with two parts alcohol, one part of glycerin and four parts of water, allow to macerate during twelve hours, and perco-

late two pints. Reserve this and continue percolation until exhaustion with one part of alcohol and three parts of water. Recover the alcohol by distillation and evaporate the balance to eight fluidounces. Add this to the reserved portion, filter if necessary, and add three pounds of sugar.

Q 2. *Eclectic Syrups.*—Frank Edel (Phar. Era, May, 1890). Formulae should be given for "Syrup of Rhubarb and Potash," "Syrup of Rumex Comp.," and other eclectic preparations generally used.

## PART II.—*Communications to the Chairman.*

A. *Status of the Formulary.*—Frank Roop Smith (Delaware), June 20, 1892. After going carefully over the formulæ of the present edition, I agree with you that with few exceptions the present formulæ are practically perfect, and that little remains to be done but to introduce such new ones as are demanded and eliminate those adopted by the United States Pharmacopœial Committee of Revision.

A 1. *Difficulty to obtain Suggestions from the Pharmacists at large.*—John A Nipgen, (Ohio), March 9, 1892, had issued a circular letter to the pharmacists of Ohio, requesting suggestions respecting a revision of the National Formulary, but has been disappointed in not receiving expected replies.

A 2. H. E. Holmes (Washington), May 5, 1892.—In order that the State of Washington might be thoroughly represented, he prepared a circular which was sent to each druggist in Washington. The replies have not been as full as he could have desired, but from the replies received he concludes that to the great majority of druggists in his state the Formulary in its present state is quite acceptable. At least, they have no changes to propose.

A 3. R. N. Girling (Louisiana), June 12, 1892. At the meeting of the Louisiana State Pharmaceutical Association he suggested in his report that the members should send either to the Chairman of this Committee, or to him, notice of any alterations or additions they might deem desirable to be made to the new edition of the National Formulary. Up to date he had not received a single answer.

A 4. Charles B. Smith (New Jersey), June 13, 1892, complains that his circular letter to the druggists of New Jersey elicited very little response. During the discussion of this matter at the recent meeting of the New Jersey State Pharmaceutical Association, it developed, however, that though the druggists had not given attention to the letter, the National Formulary had an important and established place in the business of the apothecaries of the state.

B 1. *Non-Interest of the Physicians of California in the Formulary.*—Val. Schmidt (California), March 22, 1891. "I regret to say that the physicians of California as a rule have not shown as much interest in the new work as I hoped for, judging from the way they continue to order Mr. A's Elixir, Mr. B's Compound, and Mr. C's Anodyne. It may be that the book has not been sufficiently canvassed and brought before them.

"The greatest drawback to the work here, is perhaps done by the numerous canvassers of the different nostrums, who 'sample' the physicians almost daily with some new and wonderful preparation discovered by them, and I am sorry to say that they generally make sufficient impression to cause a trial and compelling the poor druggist to continue loading up his shelves, only to end in more dead stock."

B 2. Val. Schmidt (California), March 29, 1892. "The National Formulary so far has not been as much of a success on this coast or at least in this city (San Francisco) as I have hoped. This state of affairs can hardly be attributed to a lack of circulation of the book, as nearly every physician of note had a copy sent to him through the druggist whom he patronized, and yet I cannot recollect a single instance where a physician has ordered a

preparation of the National Formulary, but on the contrary the old custom haunts us still of ordering 'Smith's Elixir,' 'Brown's Syrup,' or 'Jones' Pills,' and there is no end to them.

"The practice of 'sampling' physicians by eastern drummers has become a nuisance here, and is in my opinion the principal cause of our trouble."

C 1. *Substitutes for Proprietary Preparations.*—Chas. B. Smith (New Jersey), June 13, 1892. A resolution was offered in the New Jersey State Pharmaceutical Association, to the effect that the members of the Association make a special endeavor to urge a more extended and general use of the National Formulary by the physicians of the state. One of the points raised in the discussion was this, that none of the Formulæ are named as substitutes for certain proprietary preparations, and by a very large majority are not known as such. It was suggested that in such cases where the formula was intended as a substitute for a popular proprietary, notice of the fact be given with the formula. It is thought that this would add to the value of the book, and that popular "patents," so designated, would then be displaced from the shelves of dispensing druggists.

C 2. Geo. D. Case (Georgia), Oct. 20, 1891. An imitation, as nearly accurate as can be obtained by analytical examination and otherwise, of the leading popular proprietary preparations at this time so much used by physicians.

D. *Title Page of the Formulary.*—Chas. M. Ford (Colorado) June 7, 1892. The word unofficinal is incorrectly used. Same mistake occurs in other places. Every preparation for which a formula is given is in strictest sense *officinal*, though *unofficial.*

E. *Designation of Quantity.*—Geo. D. Case (Georgia), Oct., 20, 1891, suggests that the present plan of quantity, that is, *grains* and *ounces*, be continued in the revised edition of the Formulary.

F. *Minimum and Maximum Doses.*—Henry R. Gray (Quebec), May 28, 1892, remarks on the desirability of giving minimum and maximum doses of Pharmacopœial preparations.

G 1. *Unity of Formulas.*—M. S. Woodman (New Hampshire), Nov. 14, 1891. I think that when the National Formulary is revised it should be so changed that the manufacture of any one article shall not be dependent on having in stock or the previous compounding of so many other preparations. For example, No. 69, elix. gent. cum tinct. fer. chlor. A pharmacist must either have on hand or prepare tinct. citro-chlor. of iron and elix. gent. To make elix. gent. he must have arom. spir. and arom. elix. To make arom. elix. he must have arom. spir. To make arom. spir. he must have comp. spir. of orange. Again, to return to the original ingredients composing tinct. ferri chlor., to make tinct. citro-chlor. of iron he must have sol. of chlor. of iron.

G. 2. Val. Schmidt (California), March 19, 1892. "I have consulted a number of our leading druggists concerning the National Formulary; they seem to think as I do, that too many of the preparations are dependent upon each other. In other words, two or three preparations must be made first, before he can make what he requires. Another objection is the tedious work of detannation, which is seldom done here, as the use of the alkaloids is preferable."

G. 3. Chas. M. Ford (Colorado), June 7, 1892. Many pharmacists are deterred from using the National Formulary because in order to make a single preparation it is necessary to refer to several formulas. Small dealers, and those who do but little manufacturing, object to keeping so many stock preparations. Formula 337 (spiritus aromaticus) might be dropped with the view to simplifying the work in this direction. (See also Elixirs, C. L. D.)

H. *Brevity of Formulas.*—Henry R. Gray (Quebec), May 28, 1892. "Every formula should be as simple as possible. I could never see the sense of needlessly spinning out the processes. Short methods of making pharmaceutical preparations are of great advantage to the dispensing chemist."

I. *Stability of the Preparations of the National Formulary.*—A. B. Stevens (Michigan), April 30, 1892. "Nearly a year ago I had prepared a complete set of National Formulary elixirs, solutions and powders. At the time of manufacture they were satisfactory. At the end of three months a few had commenced to deposit. At the present time they are all in good condition except the following: 42, 63, 80, 99, 214, 369, 363."

(The conditions of change observed by Professor Stevens are mentioned under the respective numbers and corresponding titles.—C. L. D.)

K. *Preservation of Essential Oils.*—Chas. M. Ford (Colorado), June 7, 1892. It might be well to have some instruction given for the preservation of such essential oils as are prone to change.

5. *Aqua Chloroformi.*—Val. Schmidt (California), March 22, 1891. The formula for aqua chloroformi should be changed so as to insure a uniform product, by increasing the amount of chloroform, the chloroform water to be decanted when wanted for use.

6. *Aqua Hamamelidis.*—Geo. W. Sloan (Indiana), May 26, 1892. Would strike out this preparation entirely. Doubts that any pharmacist prepares it.

22. *Cordiale Rubi Fructus.*—G. H. Chas. Klie (Missouri), March 19, 1892. Instead of ground spice, add 4 fluidounces aromatic tincture.

L 1. *Elixirs: Completeness of Formulæ.*—Val. Schmidt (California), March 22, 1891. "I have heard many complaints in regard to the various elixirs, and that is, in order to make one it necessitates the making of a number. In my opinion, each formula should be complete in itself."

L 2. *Elixirs: Completeness of Formulæ.*—G. D. Case (Georgia), October 20, 1891, suggests the simplification of *elixir formulæ* so as to save references from one to another in making up.

L 3. *Elixirs: Simplification of Method of Preparation.*—G. H. Chas. Klie (Missouri), March 19, 1892. I am in favor of simplifying the method of preparing elixirs. My pet idea has always been, and I had verified it to a great extent before the National Formulary came into use, to use one base, say elixir simplex, for all or almost all elixirs. This, connected with a simple formula, not necessitating reference to the Formulary each time, and allowing the preparation of almost any elixir extemporaneously, would popularize the Formulary, so much so that it would introduce itself everywhere. The immense simplicity and advantages would be apparent at a glance. Certainly this is the way I look at it, but others may not think as I do. I would sacrifice everything to uniformity, but if simplicity could be joined to it, the result would seem to me perfection (see under 31 A).

M. *Elixirs of the Bromides.*—H. E. Holmes (Washington), May 5, 1892. Elixirs of all the bromides precipitate slightly when made up with No. 25, and seem permanent when No. 31 is used.

There is a popular demand for the colored elixirs of the bromides, but it is a question whether they are a desirable addition to the Formulary or not.

27. *Elixir Ammonii Valerianatis.*—Chas. M. Ford (Colorado), June 7, 1892. The valerianate should be dissolved in a small quantity of water, about 3 parts, before adding any elixir. In this way excess of acid would separate in oily layer, and the proper proportion of ammonia could be better determined.

31 A. *Elixir Aromaticum.*—G. H. Chas. Klie (Missouri) March 19, 1892. "Instead of 16 fl. ozs. of aromatic spirit to ½ gll. of elixir, I use only 4 fl. ozs. The former quantity is downright wasting of essential oils. When 4 fl. ozs. only are used separation of a small quantity of oil globules still takes place. When made as directed by the Formulary the separation is copious, but the oil all stays in the Talcum and is lost. I never use Talcum to clear elixirs. I think it is wrong to bring any mineral in contact with elixirs in the process of filtering. The Pharmacopœia has abandoned the process, and properly so, and the Committee of Revision for the National Formulary ought to throw out the Talcum process.

"I proceed as follows to obtain a clear uncontaminated elixir:

| | |
|---|---|
| ℞. Spiritus aurantii comp | 2 drs. |
| Spiritus vini deodorat | 16 " |
| Syrupi | 24 " |
| Aquæ | 24 " |
| Tinct. curcumæ | 20 Min. |

"The compound Spirit of Orange is added to the alcohol. Then the syrup and water are added successively, shaking each time. Finally, the Tincture of Turmeric is added and shaken. The turbid elixir is allowed to stand a week or two and then filtered through an ordinary filter. The product will be a yellowish elixir of a very good flavor, if good oil has been used, and only a slight tinge of opalescence. It will produce no precipitate with alkaloids, iodide, bromide of potassium, ammonia, or sodium, etc.

"Before the adoption of the National Formulary I had been in the habit of using Elixir Simplex as base for all elixirs. It was exceedingly simple and handy. The Simple Elixir was made with fresh orange peel, and the product, as a consequence exhibited a fine yellowish color. The National Formulary preparation does not exhibit such a fine color, hence the addition of Tincture of Turmeric.

"I would be in favor of calling Elixir Aromaticum, Elixir Simplex, and simplify the formula.

"It is necessary to make two preparations before Elixir Aromaticum can be made. Why not make it direct, without this circumlocution?

"The simpler the whole process of making elixirs the better it is, the faster will be its general adoption all over the country. If I had my way in this matter, I would adopt Elixir Simplex made as I indicated as the base for all elixirs and would advocate a general formula for all elixirs as follows:

"Take,

| | |
|---|---|
| Any fluid extract, tincture, juice, wine, or any other preparation to be exhibited in an elixir | 1 part. |
| Simple Elixir | 7 parts. |

Strain or filter if necessary.

"This for elixirs in general. With such a formula one can prepare almost any elixir offhand.

"Exceptions to the general formula can be given, but the number ought to be confined to only a few.

"This simple system of elixirs I had adopted for years before the publication of the National Formulary. Certainly I adopted the National Formulary cheerfully, and my simple system was completely disarranged and made more laborious and complicated.

"But, to secure uniformity in this class of preparations, I would abandon any system, however simple or practical."

31 B *Elixir Aromaticum.*—Adam Conrath (Wisconsin), April 29, 1892. "The Aromatic Elixirs I have had occasion to see in pharmacies, invariably had a terebinthinate odor. It is difficult to obtain a desirable Oil of Bitter Orange in our market. I would suggest that the Elixir Aurantii United States Pharmacopœia take the place of the aromatic."

42 A.—*Elixir Cinchonæ.*—Adam Conrath (Wisconsin), April 29, 1892, prefers to make this by percolating the Cinchona with Elixir Aurantii United States Pharmacopœia taking the place of the aromatic.

42 B. *Elixir Cinchonæ.*—A. B. Stevens (Michigan), April 30, 1892. After standing about a year a red deposit has formed.

44 A. *Elixir Cinchonæ Detannatum.*—Val. Schmidt (California), March 22, 1891. The Elixir Cinchonæ (simple as well as the ferrated) should be made with the alkaloids, and thus do away with the tedious process of detannation, which is done by very few.

44 B. *Elixir Cinchonæ Detannatum.*—Adam Conrath (Wisconsin), April 29, 1892, suggests the following formula:

| | | |
|---|---|---|
| Tinctura cinchonæ det. | 2½ | ounces. |
| Elix. aurantii | 8 | " |
| Syrup | 2 | " |
| Talcum | 120 | grains. |
| Water, sufficient to make | 1 | pint. |

54. *Elixir Eriodictyi Aromaticum.*—G. H. Chas. Klie (Missouri), March 19, 1892, "The use of pumice stone and carbonate of magnesium is reprehensible in any elixir, but I suppose, is unavoidable in this instance on account of the resin in the fluid extract. I believe it is pretty well understood that the disguising qualities of yerba santa are not contained in the resin. The extract might, consequently, be made with a menstruum containing only sufficient alcohol for preservation, or the resin of the present extract might be precipitated with water and the supernatant liquid concentrated to the original bulk and then used.

"I use a fluid extract at the present time made with a menstruum as indicated above, with very good result. Need neither pumice tone nor carbonate of magnesium, but simply filter.

"I use no compound elixir of taraxacum in my preparation; although it would seem that this would improve the elixir, it does not. Either one by itself is a better disguiser of quinine than the two combined. This is not at all surprising to me, for at one time I combined liquorice and yerba santa and thought it would make the *sine qua non* of quinine disguisers. But the combination did not disguise the quinine to any great extent."

63 A. *Elixir Ferri Phosphatis, Quininæ et Strychninæ.*—G. H. Chas. Klie (Missouri), March 19, 1892. This elixir always shows precipitation upon standing, even in summer. In winter about half of the salts crystallize out. It has been prepared a number of times with slight modifications to enhance permanency, but without success.

63 B. *Elixir Ferri Phosphatis, Quininæ et Strychninæ.*—Samuel L. Hilton (District of Columbia), April 29, 1892. "This is not a true elixir of the three Phosphates, but the same as made by other formulas which have been tried and proven far more satisfactory. I have frequently had it to precipitate, and on mixing I have been unable to form a clear solution. The formula I propose I have been using and has proven satisfactory, and will keep six months without change. I dissolve pure strychnia and quinia in elix. aromat. with the aid of heat; phosphate of iron in water with the aid of heat: mix the two solutions and add elixir aromat. q. s. to make the desired quantity."

63 C. *Elixir Ferri Phosphatis, Quininæ et Strychninæ.*—Adam Conrath (Wisconsin), April 29, 1892. The preparation of this formula is not stable. Prefer the formula given in the Pharmaceutical Era, May, '90, using elixir aurantii where that directs aromatic, and slightly increasing the quantity of alcohol.

Take:

| | | |
|---|---|---|
| Sulphate quinine | 128 | grains. |
| Sulphate strychnine | 1¼ | " |
| Phos. iron | 256 | " |
| Alcohol | 2½ | ounces. |
| Glycerin | 2 | " |
| Syrup | 2 | " |
| Aqua | 2 | " |
| Elixir orange | 1 | pint. |

M. lege artis.

63 D. *Elixir Ferri Phosphatis, Quininæ et Strychninæ.*—A. B. Stevens (Michigan), April 30, 1892. After standing nearly a year, a heavy white, partially crystalline deposit formed, consisting principally of free alkaloid quinine. Will suggest a remedy later.

63 E. *Elixir Ferri Phosphatis, Quininæ et Strychninæ.*—H. E. Holmes (Washington), May 5, 1892. "My experience has been that in the present process a sediment forms on the bottom and sides of the container, which I attribute to the pot. cit. By leaving out the pot. cit. this does not occur. The iron salt is readily soluble in the water. I also prefer quinine sulph. instead of quinine hydrochlor. as it keeps just as well, and is generally preferred by physicians."

65. *Elixir Ferri, Quininæ, et Strychninæ.*—Adam Conrath (Wisconsin), April 29, 1892, recommends the following modification of the formula:

Take:
Alcohol ................................................ 1 ounce.
Elix. aurantii suf. quant. to make ........................ 1 pint.
In cold weather use 2 ozs. alcohol to prevent precipitation of quinine.

67 A. *Elixir Gentianæ.*—Adam Conrath (Wisconsin), April 29, 1892, suggests the substitution of elixir aurantii for the aromatic elixir.

67 B. *Elixir Gentianæ.*—Saml. L. Hilton (District of Columbia), April 29, 1892. If made from the infusion gentian comp. fort. N. F., would be far preferable to the present formula, and when mixed with tr. ferri citro-chlor., makes a preparation which resembles the same elixir as made by the leading manufacturing pharmacists.

70. *Elixir Glycyrrhizæ.*—G. H. Chas. Klie (Missouri), March 19, 1892. Omit water of ammonia. Reason why, because if powdered quinine is mixed with the elixir and allowed to stand, the quinine granulates, forming irregular-sized lumps.

80. *Elixir Malti et Ferri.*—A. B. Stevens (Michigan), April 30, 1890. After standing nearly a year a heavy deposit has formed.

82. *Elixir Pepsini, Bismuthi et Strychninæ.*—And

83 A. *Elixir Pepsini et Bismuthi.*—G. H. Chas. Klie (Missouri), March 19, 1892. Both of these elixirs are incompatible, causing no end of trouble and vexation. They have to be filtered many times, leaving them weaker after each filtration.

83 B. *Elixir Pepsini et Bismuthi.*—Sam'l L. Hilton (Dist. of Columbia), April 29, 1892. "This elixir has always been acknowledged an unscientific preparation, and the formula as it is at present is the worst of any I have tried; it is not pleasant, it will precipitate, and the odor after standing is very disagreeable. Therefore I propose a formula for this preparation by macerating so-called soluble pepsin in elix. aromat. for seven days, straining through fine muslin, then dissolve the ammon. cit. bismuth in hot water, and enough water ammonia to form a clear solution, then mixing the two solutions, adding caramel to color and elix. aromatic to make the desired quantity.

90. *Elixir Potassii Acetatis et Juniperi.*—A. B. Stevens (Mich.), April 30, 1892. An oily deposit has formed after standing nearly a year.

95. *Elixir Rhamni Purshianæ.*—H. E. Holmes (Washington), May 5, 1892. Use "Modified fluid extract of Cascara Sagrada" in place of the fluid extract Rhamnus Purshiana. N. F., No. 165.

99 A. *Elixir Rubi Compositum.*—A. B. Stevens (Michigan), April 30, 1892. After standing nearly a year, a red deposit has formed.

99 B. *Elixir Rubi Compositum.*—G. H. Chas. Klie (Missouri), March 18, 1892, would recommend the following formula as an alternate:

Take

| | |
|---|---|
| Fluid extr. of blackberry root | 10 fl. oz. |
| " " " galls | 2 " " |
| Aromatic tincture | 4 " " |

Aromatic elixir enough to make one gallon.

Set aside a few days and filter.

105 A. *Elixir Taraxaci Compositum.*—Sam'l L. Hilton (District of Columbia), April 29, 1892. Elixir taraxaci comp. contains too much syrup; I would replace part of this with elixir aromatic.

105 B. G. H. Chas. Klie (Missouri), March 19, 1892, would propose the following formula to be given with the present one:

Take of

| | |
|---|---|
| Fluid extract of taraxacum | 4 fl. ozs. |
| " " " orange peel (sweet) | 2 " " |
| " " " liquorice root | 2 " " |
| Tinct. of cinnamon, | |
| Compound tinct. of cardamom, each | 4 " " |
| Aromatic elixir | 110 " " |

Mix. Let stand a few days and filter.

Reason why? This elixir is more pleasant than that of the Formulary. One filtration is sufficient; it is then permanent.

122. *Emulsio Olei Terebinthinæ.*—G. H. Chas. Klie (Missouri), March 18, 1892. "I would propose the following modification of the formula:

| | |
|---|---|
| Oil of turpentine | ½ fl. oz. |
| Acacia | 120 grs. |
| Aromatic elixir | ½ fl. oz. |
| Cinnamon water enough to make | 4 " " |

"Triturate the acacia and oil of turpentine together, add ½ fl. oz. of cinnamon water, and continue trituration until a perfect emulsion is formed; add the other ingredients.

"This makes a perfectly white, handsome emulsion, much better in appearance than the one of the Formulary. If quantities are measured and weighed exactly, the emulsion can be finished in a few minutes."

141. *Extractum Coffeæ Tostæ Fluidum.*—G. H. Chas. Klie (Missouri), March 19, 1892. "I would recommend a menstruum of water and glycerin, the latter from 15 to 25 per cent. The extract is best made by repercolation. The product is very elegant, has a fine aroma and color, and can be used for making drinking coffee extemporaneously. As a matter of course, it makes an elegant syrup. The keeping qualities are good. I have kept the extract for years in good condition."

151. *Extractum Glycyrrhizæ Depuratum.*—G. H. Chas. Klie (Missouri), March 19, 1892. "The use of rye straw is recommended to facilitate the process of extracting. On account of the great proneness to formation of fungus when straw is used, I now use disks of glass and glass rods for the same purpose. The extract is packed in a percolator or other suitable vessel. Instead of straw, glass disks of suitable size are arranged one above the other in such a manner that the upper disk does not come in contact with the liquorice of the row beneath it. The liquorice is laid side by side on the disks with glass rods between them, allowing the water free access to all parts. I have used this method for at least twelve years with excellent results. Instead of alcohol I add salicylic acid to preserve the extract. I find five grains of the acid amply sufficient to preserve a quart of extract against fungus and fermentation."

160. *Extractum Malti Fluidum.*—L. E. Sayre (Kansas), May 5, 1892, suggests the addition of 15 to 20 per cent. of glycerin to the menstruum. By this addition he is sure that the diastatic power of this preparation is increased considerably.

207. *Liquor Bismuthi.*—J. O. Burge (Tennessee), June 22, 1892. "There is a suggestion I would make in regard to the second formula for liq. bismuthi, and that is that instead of dissolving the cit. bismuthi and am. in 13 ounces of water, that only one ounce of water be used, and have that hot; and when cold add aqua ammonia q. s. to clear up the solution, then add the remainder of the water, filter, add the alcohol. By using the smaller quantity of water, I think there is less liability of getting more ammonia than is necessary."

212. *Liquor Cupri Alkalinus.* (*Additional Formula*).—Frank Roop Smith (Delaware), June 20, 1892, suggests that a formula for Fehling's solution using glycerin instead of Rochelle salt and potassa (instead of soda) be *also* added, as he, with others, finds it to work nicely and to keep better than that made by the present formula.

Fehling's solution with glycerin:

| | |
|---|---|
| Sulphate of copper, pure (crystallized) | 34.639 gms. |
| Glycerin (sp. gr. 125) | 120 c. c. or 150 " |
| Potassa (U. S. P. 1880) | 130 " |
| Distilled water, sufficient quantity. | |

Dissolve the copper salt and glycerin in 300 c. c. distilled water. Dissolve the potassa in 500 c. c. distilled water, mix solutions, add enough distilled water to bring to the volume of 1000 c. c., and mix.

214. *Liquor Extracti Glycyrrhizæ.*—A. B. Stevens (Mich.), April 30, 1892. After standing nearly a year a heavy brown deposit has formed.

214 A. *Liquor Zinci et Ferri Compositus.* A. B. Stevens (Michigan), April 30, 1892. After standing nearly a year a red deposit has formed.

241 B. *Liquor Zinci et Ferri Compositus.*—Geo. W. Sloan (Indiana), May 26, 1892, suggests to replace the 16 ounces of sulphate of iron with 8 ounces of sulphate of copper, and thus gain a more efficient article and also avoid the iron-staining of clothing, etc., which is liable to occur from the former. Doubts the utility of naphthol.

253 A. *Mistura Chloral et Potassii Bromidi Composita.*—Leo Eliel (Indiana), Oct. 17, 1888. "The mixture in my hands yields a total of 17 fluidounces and 3 drams, and directions are to total up to 16 fluidounces after solution is effected—showing that formula needs reconstruction."

253 B. *Mistura Chloral et Potassii Bromidi Composita.*—J. A. Nipgen (Ohio), March 9, 1892, suggests the omission of tincture quillaja and extract of Indian cannabis.

254. *Mistura Chloroformi et Opii.*—Geo. W. Sloan (Indiana). "I would substitute the Chandler formula as being preferable.

"It is as follows:

| | |
|---|---|
| ℞. Morph. sulph. | 4 grains. |
| Extr. cannab. ind. | 8 " |
| Chloroform | 1 fl. dr. |
| Oil menth. pip. | 2 min. |
| Oil capsicum | 1 " |
| Alcohol, | |
| Glycerin, of each suf. to make 1 fl. oz. | |

"The alcohol and glycerin should be in proportion of alcohol 3, glycerin 1, by volume. This makes a perfectly homogeneous mixture, and does not require shaking on account of separation."

270. *Oleatum Aconitinæ.*

271. *Oleatum Plumbi.*

273. *Oleatum Zinci.*—Frank Roop Smith (Delaware), June 20, 1892, suggests that in Formula No. 270, olive oil (glyceryl oleate) be used in part instead of oleic acid, thus preventing an unnecessarily acid preparation, and in no wise interfering with its absorption. For the same reason, that in notes to Nos. 271 and 273, olive oil be used instead of oleic acid.

279 A. *Pepsinum.*—G. H. Chas. Klie (Missouri), March 19, 1892. Fix the standard at 1000, and give a formula for its preparation.

279 B. *Pepsinum.*—Saml. L. Hilton (Dist. of Colum.), April 29, 1892. The standard should be increased from 500 to 1000. If working with higher test pepsin, especially in making preparations of various kinds, it is far more convenient to work on a basis of 1000 than 500. The demand is also for high-test pepsin.

282. *Pilulæ.*—G. H. Chas. Klie (Missouri), March 19, 1892. Give the best method for sugar-coating or gelatin-coating pills on the small scale.

319. *Pulvis Pepsini Compositus.*—Saml. L. Hilton (Dist. of Colum.), April 29, 1892. I suggest that the acids be mixed and placed in a mortar and the powders previously mixed gradually added to them. Finally rub the mixture through a hair sieve."

324. *Sal Kissingense Factitium.*

326. *Sal Vichyanum Factitium.*—Frank Roop Smith (Delaware), July 29, 1891. "I think Formulæ Nos. 324 and 326 would be improved by having the magnesium sulphate given as a crystallized salt instead of the anhydrous salt, it being always easily procurable, and the moisture thus introduced not in anywise interfering with the preservation in powder forms (not even in No. 326, containing potassium carbonate)."

The corresponding amount for No. 324 would be 121 parts, and the amount to be dissolved in fl. oz. 6 of water would be increased to 27 gr. for No. 326—33 parts crystallized salt, and 14.5 or 15 grs. to 6 fl. oz. of water.

333. *Species Laxantes.*—G. H. Chas. Klie (Missouri), March 19, 1892. "The present German Pharmacopœia directs tartrate of potassium and tartaric acid each separately dissolved in water, and sprinkled over the senna separately and one half hour apart. I have tried this method and find it much preferable to the other."

337. *Spiritus Aromaticus.*—Chas. M. Ford (Colorado), June 7, 1892, advises that this formula be dropped (see G. 3, Unity of Formulas).

338. *Spiritus Aurantii Compositus.*—Chas. M. Ford (Colorado), June 7, 1892, advises that this formula be dropped (see G 3, Unity of Formulas).

M. *Syrups.*—Geo. D. Case (Georgia), October 20, 1891. "I suggest the introduction of 20 per cent. (average) of glycerin, pure, into all syrups. I believe the next Pharmacopœia would be improved in this point."

351. *Syrupus Actææ Compositus.*—Saml. L. Hilton (Dist. of Columbia), April 29, 1892. This is an improvement over the old formula, but some means might be suggested to prevent precipitation, which frequently occurs.

353. *Syrupus Coffeæ.*—G. H. Chas. Klie (Missouri), March 19, 1892, would recommend the following instead of the present formula:

Take of:

Fluid extract of coffee, made with a menstruum, as given above (see 141) .................................... 4 fluid ounces.

Simple syrup ....................................12 " "

Mix.

361. *Syrupus Eriodictyi Aromaticus.*—G. H. Chas. Klie (Missouri), March 19, 1892. This syrup, made with solution of potassa, is open to the same objections as the elixir when made with ammonia.

Quinine mixed with this syrup will remain nice and smooth for 24 to 36 hours, according to the temperature where it stands; it then gradually granulates, or rather agglomerates in smaller and larger masses, which cannot be divided by shaking.

A syrup prepared from a fluid extract, prepared as indicated under elixir eriodictyi, does not show this unpleasant characteristic. It disguises the taste of quinine well, and remains smooth after many days' standing.

363. *Syrupus Ferri Citro-Iodidi.*—A. B. Stevens (Michigan), April 30, 1892. Theoretically the formula is all right, but practically there is not enough ferrous iodide formed to combine with the second addition of iodine in the syrup. Remedy: In the formation of the ferrous iodide, use 295 grains instead of 267 grains, and then add 133 grains of iodine to form the ferric iodide.

369. *Syrupus Glycyrrhizæ.*—A. B. Stevens (Michigan), April 30, 1892. Becomes mouldy in a short time.

370. *Syrupus Hypophosphitum Compositus.*—H. E. Holmes (Washington), May 5, 1892. Use $\frac{1}{81}$ grain of strych. sulph. instead of each 1¼ m. of tinct. of nux vomica, or 2 grains strych. sulph. to 16 ounces syr., with the following process:

Dissolve hypophos. of iron and manganese with pot. cit. and a portion of citric acid in one ounce of water by warming gently; in this solution dissolve a portion of sugar. Dissolve the quinine and strych. sulph. in 5 ounces of water; then dissolve the calcium, sodium and potash hypophosphites in this solution and let them stand a few hours and decant. Dissolve the residue with remaining portion of citric acid, and mix the solutions, in which dissolve remainder of sugar, and add the whole to the iron and manganese solution, and add water to make 16 ounces.

375. *Syrupus Papaveris.*—Val. Schmidt (California), March 22, 1891. The syrup papaveris, of the National Formulary, is of uncertain strength when made with the fluid extract. He would recommend the following:

| | |
|---|---|
| Morph. sulph. | 4 grains. |
| Syrup simpl. | 1 pint |
| Caramel | 6 drops. |

376. *Syrupus Pectoralis.*—Geo. D. Case (Georgia), Oct. 29, 1891. "I beg that your formula for Jackson's pectoral syrup on page 134 be changed as in the note. This syrup properly made is an elegant and pleasant medicine, and as in the National Formulary is not at all agreeable. I suggest the following as a practical working plan, which I follow and which makes a nice syrup. Jackson's pectoral syrup, for ½ gallon.

| | |
|---|---|
| Sassaf. medull | 2 drachms |
| Acacia (select) | 2 ounces. |
| Sugar, gran. | 3 pounds. |
| Morphia, muriat. | 16 grains. |
| Glycerin, pure | 8 ounces. |
| Water sufficient to make 4 pints. | |

Let sassaf. pith and acacia stand four hours in 1 pint of water, occasionally stirring. Strain off and add sugar, morphia, glycerin and enough water to make up a half-gallon. Then stir occasionally until the sugar is dissolved. Let stand 12 hours and draw off with syphon.

427. A. *Vinum Carnis et Ferri.*—G. H. Chas. Klie (Missouri), March 19, 1892. "This preparation ought also to be known under the name of

"*Elixir Carnis et Ferri cum Vino Xerico,* since it is prescribed that way frequently. The formula may be improved by adding one ounce of simple syrup and one ounce of aromatic elixir."

427 B. *Vinum Carnis et Ferri.*—Sam'l L. Hilton (District of Columbia), April 29, 1892. "This is unsatisfactory in my hands. I have never been able to prevent precipitation, even after repeated filtrations. I think a far better formula can be obtained."

427 C. *Vinum Carnis et Ferri.*—Adam Conrath (Wisconsin), April 29, 1892. "The preparation of the N. F. does not compare well with the preparations of the market. The following formula has given me good satisfaction:

| | |
|---|---|
| Extract beef | 256 grains. |
| Citrate iron and ammonia | 64 " |
| Water, | |
| Alcohol, | |
| Elixir aurantii, | each 4 oz. |
| Sherry wine sufficient to make | 1 pint. |

Allow to stand a few days, and filter."

428. *Vinum Carnis, Ferri et Cinchonæ.*—G. H. Chas. Klie (Missouri), March 19, 1892. "This formula, like 427 (see above), should also appear under the elixirs, and the formula improved by the addition of 2 fluidounces of aromatic elixir.

ADDITIONS PROPOSED.

N. *Adeps Benzoat.**—Val. Schmidt (California), March 22, 1892. "The formula for benzoated lard is unsatisfactory and I believe rarely followed. I suggest the following:

| | |
|---|---|
| Adeps | 16 ounces |
| Tincture Benzoin Simple | ½ fl. oz. |

Melt the lard, add the tincture of benzoin, and keep at a temperature of about 175° for about 15 minutes, or until the alcohol has all evaporated and the gum precipitated, then decant the clear benzoated lard and stir until cold.

N. N. *Antikamnia.*—Frank Roop Smith (Delaware), June 20, 1892, recommends that a formula for a preparation similar to "Antikamnia" be given. Numerous formulæ for this have been published, which vary greatly, and all of which he believes, are of doubtful accuracy. If it is decided by the Committee to give such a formula, and if the Committee desires it, he will make an analysis himself and furnish a formula such as only the most careful and accurate analysis would determine.

O 1. *Elixir Buchu, Juniper, and Acetute of Potassium.*—John A. Nipgen (Ohio), March 9, 1892. A "Diuretic Elixir" made by dissolving 640 grains of acetate of potassium in 16 fluidounces of comp. elixir of buchu, (N. F. No. 34).

O 2. *Elixir Ferri et Quininæ Citratis.*—G. H. Chas. Klie (Missouri), March 19, 1892. A formula for this elixir ought to be added. I propose the following:

Take of

| | |
|---|---|
| Citrate of iron and quinine (soluble) | 256 grains |
| Water | 1 ounce |
| Aromatic elixir, sufficient to make | 16 fl. oz. |

Dissolve the soluble citrate of iron and quinine in the water and add aromatic elixir to make 16 fluidounces. Filter.

O 3. *Elixir Gentianæ Compositum.*—G. H. Chas. Klie (Missouri), March 19, 1892, proposes the following formula:

Take of

| | |
|---|---|
| Comp. tinct. of gentian | 2 fluidounces. |
| Aromatic elixir | 14 " " |

Mix. Filter if necessary.

* Should be referred to the Com. of Revision of the U. S. P.—C. L. D.

O 4. *Elixir of Lactopeptin.*—G. H. Chas. Klie (Missouri), March 19, 1892. "A formula for this elixir should be given."

O 5. *Elixir of Paraldehyde.*—Sam'l L. Hilton (District of Columbia), April 29, 1892. "The formula in Remington's Practice of Pharmacy makes an excellent preparation. I suggest this be included in the next revision, so as to permit pharmacists generally to make it of uniform strength."

O 6. *Elixir of Phosphate of Iron and Quinine.*

O 7. *Elixir of Phosphate of Iron, Quinine and Arsenic.*

O 8. *Elixir of Phosphate of Iron, Quinine and Strychnine.*—Frank Roop Smith (Delaware), July 29, 1891, suggests that formulæ for elix. phosphate iron and quinine; elix. phosphate iron, quinine and arsenic; elix. phosphate iron, quinine and strychnine, resembling Wyeth's, be introduced, provided such are not contained in the next edition of U. S. P., and can furnish the necessary formulæ if desired.

O 9. *Elixir of Pyrophosphate of Iron, Quinine and Strychnine.*—Chas. M. Ford (Colorado), June 7, 1892. "An elix. pyrophos. iron, quinine and strychnine should be added, because it is ordered. The old formula of Prof. Diehl's is as good as any."

O 10. *Elixir Simplex.*—G. H. Chas. Klie (Missouri), March 19, 1891, suggests the following formula:

Take of

| | |
|---|---|
| Spir. of orange (see additions) | 4 fluidounces. |
| Deodorized alcohol | 2 pints. |
| Simple syrup | 3 " |
| Cinnamon water, enough for 1 gallon. | |

When spirit of orange is used which has been made from the fresh peel, the elixir needs no filtration. Instead of the spirit from the peel, one may be made from the essential oil; a little tincture of turmeric must be added to this to produce the straw color. The elixir simplex, prepared according to the formula given above, exhibits a nice straw color. I have used this elixir during many years for making all my elixirs. It gave splendid satisfaction. It is much more simple to make than the aromatic elixir of the Formulary. It looks elegant and has a fine flavor; all points in its favor.

O 11. *Elixir Sumbul.*—G. H. Chas. Klie (Missouri), March 19, 1892, proposes the following formula:

Take of

| | |
|---|---|
| Tinct. of sumbul | 2 fluid ounces. |
| Aromatic elixir | 14 " " |

Mix.

O 12. *Elixir Sumbul Compositum.*—G. H. Chas. Klie (Missouri), March 19, 1892, proposes the following formula:

Take of

| | |
|---|---|
| Tinct. of sumbul | 2 fluid ounces. |
| Comp. tinct. of cardamom | 1 " " |
| Aromatic elixir | 13 " " |

Mix.

O 13. *Elixir Viburni Aromaticum.*—R. N. Girling (Louisiana), June 12, 1892, proposes the following formula:

Take of

| | |
|---|---|
| Viburnum prunifolium | 500.0 |
| Ceylon cinnamon | 250.0 |
| Cloves | 125.0 |
| Dilute alcohol, | q. s. |
| Syrup | 600.0 |

Reduce the substances to powder. Moisten with the dilute alcohol. Pack in percolator, and after twenty-four hours percolate with dilute alcohol to obtain 3400.0 of product, to which add the syrup. After forty-eight hours filter through paper.

P. *Emplastrum Cantharidis pro Equis.*—G. H. Chas. Klie (Missouri), March, 1892. "A formula for a good, reliable horse blister would find appreciation. Horse blister is frequently demanded."

Q. *Fluid Extract of Cascara, "Modified."*—H. E. Holmes (Washington), May 5, 1892. "I would add to the Formulary '*Modified' Fluid Extract Cascara Sagrada*, as follows:

| | |
|---|---|
| No. 40 powder | 16 ounces. |
| Carb. magnesia | 2 " |

"Mix the drug with carb. mag. and make a fluid extract, using process A. Menstruum: Dilute alcohol."

R. *Gargarisma Guaiaci Comp.*—R. N. Girling (Louisiana), June 12, 1892, proposes the following formula:

| | |
|---|---|
| Tinct. guaiaci ammoniata | ½ ounce. |
| " cinchona composita | ½ " |
| Mellis | 1½ " |
| Potassii chloratis | 160 grains. |
| Aquæ, ad | 8 ounces. |

Mix the honey with the tincture of guaiacum am., add the tinct. cinchona, and lastly, the chlorate of potassium, dissolved in the water.

S. *Lactopeptine.**—G. H. Chas. Klie (Missouri), March 19, 1892. "A practical formula for this preparation should be given. The formula is given on each bottle. A practical method of combining the ingredients is all that is necessary."

T 1. *Liniment. Aconiti Compos.*—Geo. D. Case (Georgia), Oct. 20, 1891, recommends a compound aconite liniment (not greasy) prepared by the following formula:

| | |
|---|---|
| Tinct. of aconite root, | |
| Oil of turpentine, of each | 2 fluidounces. |
| Tinct. of arnica | 4 " " |
| Chloroform, | |
| Water of ammonia, of each | 8 " " |
| Soap liniment (U. S. P.) sufficient to make 4 pints. | |

Let stand an hour and decant.

T 2. *Compound Chloroform Liniment.*—Val. Schmidt (California), March 29, 1892. "There is a demand for a uniform compound chloroform liniment; it is largely prescribed here, but not having a standard, great variation of strength is the result. I suggest the following formula, which I have used for over twenty years with good results, and would recommend it as an addition to the National Formulary:

*Formula No. 319. Pulvis pepsini compositus is doubtless intended to replace this proprietary preparation.—C. L. D.

| | | |
|---|---|---|
| Chloroform, | | |
| Tinct. aconiti rad. āā | 2 | ounces. |
| Tinct. opii | 4 | " |
| Liniment. saponis | 12 | " |

Mix and filter under cover."

U 1. *Disinfectant Solutions.*—Henry R. Gray (Quebec), May 28, 1892. "A few disinfectants, or rather strengths for dispensing, might, with advantage, be added to the Formulary, for instance:

"*Solutio Hydrarg. Perchlor., No. 1.* — For putting in the chamber vessels for receiving the dejections in typhoid fever.

"*Solutio Hydrarg. Perchlor. No. 2.* — For placing clothes, etc., in to soak before leaving the sick room, and for washing the hands of the nurses in variola, etc., etc.

"*Solutio Potass. Permanganatis.*—For urinals, water closets, etc., etc."

U 2. *Listerin.*—Leo Eliel (Indiana), Oct. 17, 1888. "It would be very desirable to add a formula corresponding to the trade-marked preparation known as 'Listerin.'"

U 3. *Liquid Lactopeptin.* — G. H. Chas. Klie (Missouri), March 19, 1892. "A formula for this might also be given (see S.)."

U 4. *Effervescent Solution of Sulphate of Magnesium.*—Henry R. Gray (Quebec), May 28, 1892. "A liquid effervescing purgative to replace the unstable eff. fluid citrate of magnesia is a desideratum. I make a preparation containing mag. sulph. which is very pleasant and efficient. Shall be happy to send you the formula."

V 1. *Anæsthetic Mixture.*—Henry R. Gray (Quebec), May 28, 1892. "There is an anæsthetic much used here (in Montreal), but there is no official standard for it. It is composed of chloroform, æther and alcohol."

V 2. *Compound Tannin Mixture.* John A. Nipgen (Ohio), March 9, 1892, proposes the following formula for a "Tasteless Syrup of Quinine":

| | | |
|---|---|---|
| Tannin | 120 | grains. |
| Sulph. quinine | 320 | " |
| Syrup, | | |
| Peppermint water, āā | 16 | fluidounces. |

W. *Oleatum Cupri.*—Frank Roop Smith (Delaware), June 20, 1892, suggests the following formula for oleate of copper, which is often used in ointment:

| | | |
|---|---|---|
| Sulphate of copper (crystallized) | 3 | Troy ounces. |
| Solution of oleate of sodium (N. F.) | 8 | pints. |
| Boiling water | 4 | " |

Dissolve the sulphate of copper in one pint of boiling water, filter if necessary, and add to the solution of oleate of sodium previously heated to boiling, stirring vigorously with a glass rod during the addition. Allow to cool, and decant the watery solution, keeping the oleate (which will mostly adhere to the sides of the vessel) back with the glass rod. Add the remaining boiling water to the oleate, and wash by inclining the vessel and stirring with the rod. Allow to cool and again decant. Invert the vessel in a cool place for the adhering moisture to evaporate. Transfer the dried oleate to a tared capsule, heat on a water-bath until every trace of enveloped water has evaporated, and weigh. To each 100 parts of the neutral oleate thus prepared (containing 12.088 CuO) add 20.88 parts of olive oil, mix intimately and transfer to suitable vessels. The finished product will contain the equivalent of 10 per cent. copper oxide (CuO).

W W. *Oleum Acidi Carbolici.*—Henry R. Gray (Quebec), May 28, 1892. "Oleum acidi carbolici is often used here (in Montreal), and is very much prescribed. But we are at a loss to know in some cases what strength to send."

X. *Antibilious Pills.*—Henry R. Gray (Quebec), May 28, 1892. "The Pill. Cath. Co., U. S. P., is complained of as being too griping. A standard antibilious pill, free from griping properties, is desired."

Y 1. *Effervescent Powders.*—G. H. Chas. Klie (Missouri), March 19, 1892. "The number of 'Effervescentiæ' should be increased."

Y 2. *Pulvis Capitis Dolor.*—G. H. Chas. Klie (Missouri), March 19, 1892. "Several formulæ for headache powders ought to be given."

Y 3. *Pulvis Magnesiæ Compositus.*—M. S. Woodman (New Hampshire), Nov. 14, 1891. "I would suggest the introduction of pulvis magnesiæ compositus. I would suggest for it some such formula as the following:

| | |
|---|---|
| Magnes. calc. | 4 parts. |
| Pepsin sacch. | 8 " |
| Pulv. rhei. | 1 " |

"There is a demand in this section for such a preparation, and I find it very valuable in many cases of indigestion."

Y 4. *Pulvis Sanativus.*—G. H. Chas. Klie (Missouri), March 19, 1892, proposes the following formula for a "Healing Powder:"

Take of

| | |
|---|---|
| Calomel | 4 parts. |
| Talcum in fine powder | 12 " |

Mix. This is an excellent preparation to use on horses, when the collar has abraded the skin. It heals the abrasion over night.

Z. *Spiritus Aurantiorum Recentium.*—G. H. Chas. Klie (Missouri), March 19, 1892, proposes the following formula:

Take of

| | |
|---|---|
| Fresh orange peel (sweet) decorticated | 5 parts. |
| Deodorized alcohol | 10 " |
| Water | 6 " |

Macerate during seven days in a moderately heated place, express and filter.

A A. 1. *Syrupus Cerasorum.*—G. H. Chas. Klie (Missouri), March 19, 1892. "A formula for syrup of cherries would be desirable."

A A. 2. *Syrup of Codeine.*—Val. Schmidt (California), March 22, 1891, proposes the following formula:

| | |
|---|---|
| Codeinæ. | 16 grains. |
| Spirit. vin. rect | 1½ dr. or q. s. |
| Syrup. simpl. | 1 pint. |

Dissolve the codeine in the alcohol and mix with the syrup.

A A 3. *Syrup of Codeine Sulph.*—Henry R. Gray (Quebec), May 28, 1892. "Codeine is very much used here (in Montreal) in certain forms of lung diseases and in ordinary coughs, instead of morphine." Suggests a syrup, say ½ grain sulph. codeine in each teaspoonful. Adds the following formula:

| | |
|---|---|
| Codeinæ sulph. | 64 grains. |
| Aq. flor. aurant | 2 ounces. |
| Syrup. simpl. | 14 " |

Mix. Syrup of codeine is in the French codex, but is much too weak.

A A 4. *Syrupus Eucalypti Globuli.*—Val. Schmidt (California), March 22, 1891, proposes the following formula:

| | |
|---|---|
| Ext. flu. Eucalyptus glob. | 2½ ounces. |
| Magnes. carbon | 1½ " |
| Aqua ad. | 1 pint, or q. s. |
| Sacchar. alb. | 30 ounces. |

Rub the magnesium with the fluid extract in a mortar, adding the water gradually. Allow the mixture to stand for an hour, throw the whole on a filter, and add enough water through the filter to make 1 pint. Add the sugar and dissolve without heat.

A A 5. *Syrupus Fragorum.*—G. H. Chas. Klie (Missouri), March 19, 1892. A formula for syrup of strawberries would be desirable.

A A 6. *Syrup of White Pine Compound.*—Samuel L. Hilton (District of Columbia), April 29, 1892. "The main reason for this preparation is to supply a demand which has been created. The retail pharmacist can make this preparation as well as the manufacturer and at less cost. I make it from fluid extracts white pine bark, wild cherry, spikenard, balm of Gilead buds, bloodroot, and sassafras, by mixing with glycerin and purified talcum, triturating with water, filtering, making syrup by agitation or percolation, then adding the chloroform and the sulphate morphia."

A A 7. *Tasteless Syrup of Quinine.*—See addition V 2, "Compound Tannin Mixture."

B B. *Tinct. Viburnum Opulus Comp.*—Samuel L. Hilton (District of Columbia), April 29, 1892. "A preparation which I have been using for some time, and which I have succeeded in getting some of the physicians to use under the name of Viburnum opul. comp., I offer as a substitute for Hayden's viburnum comp. It consists of cramp bark, wild yam, skullcap, cloves and cinnamon, which are macerated and percolated with a mixture of alcohol, water and glycerin. I will present working formula and samples later."

C C. *Trochisci Quininæ Tannatis.*—R. N. Girling (Louisiana), June 12, 1892, offers the following formula:

| | |
|---|---|
| Tannate of quinine | 40.0 |
| Sugar, in powder | 120.0 |
| Chocolate, in powder | 160.0 |
| Ext. liquorice, in powder | 40.0 |
| Saccharin | 5.0 |
| Tragacanth | 5.0 |
| Essence vanilla | 10.0 |
| Water, a sufficient quantity. | |

Beat into a mass and divide into 320 lozenges, each containing about 2 grains of the tannate, or into 160 lozenges, each containing 4 grains.

D D 1. *Iodine Ointment.**—John A. Nipgen (Ohio), March 9, 1892, suggests the following formula:

| | |
|---|---|
| Iodine | 4 parts. |
| Iodide potassium | 1 " |
| Water | 2 " |
| Lanolin, | |
| Vaselin (not petrolatum) q. s. to make 100 parts. | |

D D 2. *Ung. Stramonii Co.*—Val. Schmidt (California), March 22, 1892, suggests the following formula:

*Should be referred to the Com. of Revision of the U. S. P.—C. L. D.

| | |
|---|---|
| Pulv. opii | ½ dr. |
| " camphoræ | 1 " |
| " gallæ | 2 " |
| Plumb. acet | 1 " |
| Ung. stram. | |
| " simpl. each | 1 oz. |
| Glycerin | 2 drs. |

Mix. The above is a good pile ointment and often prescribed.

E E 1. *Vinum Creasoti.*—Val. Schmidt (California), March 22, 1891. Vinum creasoti is often prescribed. The formula is as follows:

| | |
|---|---|
| Creasot. lignor. | 2 drs. |
| Spirit. vin. rect. | 4 ozs. |
| Glycerin. pur. | 3 " |
| Vin. Xerici suf. to make | 2 pints. |

Mix. Filter.

E E 2. *Vinum Ferri et Potassii Tartrat.*—G. H. Chas. Klie (Missouri), March 19, 1892. Wine of iron containing the tartrate of iron and potassium is prescribed by some physicians, and a formula in the National Formulary would be acceptable. The following formula is suggested:

| | |
|---|---|
| Tartrate of iron and potassium | 160 grs. |
| Water | ½ fl. oz. |
| Water of ammonia. | suf. quantity. |
| Angelica wine (California) to make | 16 fl. ozs. |

Dissolve the tartrate of iron and potassium in the water. Neutralize all traces of acid in the wine carefully with ammonia, and mix the two solutions. Filter.

E E 3. *Vinum Ferri et Quin. Citr.*—Val. Schmidt (California), March 22, 1891, proposes the following formula:

| | |
|---|---|
| Ferri et quin. citr. | 48 grs. |
| Aquæ destil., | |
| Syrup. limonis, of each | 2 ozs. |
| Vin. Xerici, suf. to make | 1 pint. |

## Part III.—*Examination of Typical Specimens of National Formulary Preparations.*

The preparations placed in my care at the Detroit meeting of the Association, in 1888, were left intact in the packing cases, which, on their arrival here, were placed in a well-ventilated and dry cellar, and so remained until May, 1892, when they were opened and their condition found to be as described under their respective numbers and titles following.

The name given after the title is that of the person who made the preparation for the Committee.

1. *Acetum Aromaticum*—D. L. Cameron.—Perfectly clear, light straw colored, apparently unchanged.

3. *Acidum Hypophosphorosum Dilutum*—Emlen Painter.—Owing to imperfect corkage, had leaked out to the amount of 25 per cent. No physical change, except possibly a faint color derived from cork. Chemical test revealed the absence of phosphoric acid, and the preparation appeared practically unchanged.

5. *Aqua Chloroformi*—Chas. Rice.—No apparent change.

7. *Aqua Sedativa*—Chas. F. Schleussner.—A slight deposit with floating crystals of camphor had formed. Of a decided straw color, evidently derived from the cork, which was nearly destroyed by the ammonia.

8. *Balsamum Traumaticum*—A deep brown liquid, almost absolutely clear, and evidently unchanged.

9. *Bismuthi Oxidum Hydratum*—Chas. Rice.—Unchanged.

11. *Caffeinæ Citras Effervescens*—L. C. Hopp.—Two specimens: A. Powdery; B. Granular.

A. White, caked, not separable by shaking; somewhat damp; immediately but slowly effervescent; readily and completely soluble, forming a nearly colorless solution.

B. Brownish-white, distinct granules, coherent, but easily shaken asunder; immediately effervescent and more decided than A.; rapidly soluble, forming a clear straw-colored solution.

11. *Caffeinæ Sodio-Benzoas*—Chas. Caspari, Jr.—A light, nearly pure white powder, readily and completely soluble in water, forming a nearly colorless solution.

13. *Caffeinæ Sodio-Salicylas*—Chas. Caspari, Jr.—A somewhat damp, caked powder, nearly white with a pinkish tinge; completely soluble in water, forming a colorless solution.

14. *Carbasus Carbolata*—C. S. Hallberg.—Apparently unchanged, though possibly a little of the carbolic acid has been vaporized or lost.

16. *Ceratum Camphoræ Compositum*—D. L. Cameron.—In good condition; apparently unchanged.

18. *Collodium Iodatum*—C. A. Rapelye.—In good condition.

19. *Collodium Iodoformatum* — C. A. Rapelye.—A deep brown, clear liquid. Evidently changed. (Should be faint yellow.)

20. *Collodium Tiglii*—C. A. Rapelye.—A perfectly bright, light brownish-yellow liquid. Apparently unchanged.

21. *Collodium Salicylatum Compositum*—C. A. Rapelye.—A perfectly clear, deep olive-brown liquid. Apparently unchanged.

22. *Cordiale Rubi Fructus*—Chas. Caspari, Jr.—A slightly turbid, red liquid, with small deposit. Odor and taste apparently unimpaired.

23. *Decoctum Aloes Compositum*—Chas. Rice.—A perfectly bright, very deep-brown liquid, with scarcely appreciable deposit. Apparently unchanged.

24. *Elixir Acidi Salicylici*—D. L. Cameron.—Perfectly clear, but the color has evidently deepened, being faint brownish-yellow, with a reddish tinge. The odor also has suffered, and is not as pronounced and pleasant as that of aromatic elixir. (Base: aromatic elixir.

25. *Elixir Adjuvans*—D. L. Cameron.—Turbid, light brown, with some deposit. Odor is good.

26. *Elixir Ammonii Bromidi*—M. L. Woodman.—Clear, reddish brown, with considerable deposit. Odor good. (Base: adjuvant elixir.)

27. *Elixir Ammonii Valerianatis*—M. L. Woodman.—Clear, light brown, free from deposit. Odor pronouncedly of valerianic acid. Otherwise unexceptionable. (Base: aromatic elixir.)

28. *Elixir Ammonii Valerianatis et Quininæ*—M. L. Woodman.—Clear, light brown, some deposit. Odor pronouncedly of valerianic acid. (Base: aromatic elixir.)

29. *Elixir Anisi*—Chas. Rice.—Clear, nearly colorless, and apparently in perfect condition.

30. *Elixir Apii Graveolentis Compositum*—C. S. Hallberg.—Clear, light olive-brown, with slight deposit; odor and other conditions apparently unchanged. (Base: aromatic elixir.)

31. *Elixir Aromaticum*—S. J. Bendiner.—Clear, nearly colorless, and of good odor. Evidently unchanged.

32. *Elixir Bismuthi*—J. M. Good.—Clear, with small, compact, black deposit, having the appearance of metallic sulphide. Of deep brown yellow color, and good, but faintly ammoniacal odor. Reaction slightly alkaline. Evidently changed—possibly by slight excess of ammonia. (Base: aromatic elixir.)

33. *Elixir Buchu*—J. M. Good.—Faintly turbid, with slight deposit of a brown color. Of a deep red-brown color, and decided buchu odor. Condition fairly good. (Base: adjuvant elixir.)

34. *Elixir Buchu Compositum*—J. M. Good.—Turbid, with small brownish deposit, of a brown color, and good odor. (Base: adjuvant elixir.)

35. *Elixir Buchu et Potassii Acetatis*—J. M. Good.—Faintly turbid, with slight deep brown deposit. Of a deep brown color and good buchu odor. (Base: adjuvant elixir.)

36. *Elixir Caffeinæ*—J. M. Good.—Clear, with scarcely perceptible deposit. Of a light yellowish-brown color, and of good odor. (Base: aromatic elixir.)

37. *Elixir Calcii Bromidi*—J. M. Good.—Clear, but with a large brown deposit. Of a light red-brown color, and of good odor. (Base: adjuvant elixir.)

38. *Elixir Calcii Hypophosphitis*—J. M. Good.—Perfectly clear, nearly colorless, and of good odor. (Base: aromatic elixir.)

40. *Elixir Catharticum Compositum*—C. R. Paddock.—Clear, with scarcely perceptible deposit. Of a very dark brown color, and good odor. (Base: elixir of licorice and compound elixir of taraxacum.)

41. *Elixir Chloroformi Compositum*—M. L. Woodman.—Clear, of a deep brownish-red color, and good odor.

42. *Elixir Cinchonæ*—D. L. Cameron.—Clear, but characteristic cinchona encrustation on sides and a slight deposit; of a light brownish-yellow color; the odor not satisfactory—though possibly not changed from original—the cinchona odor predominating. (Base: aromatic spirit, syrup and water.)

43. *Elixir Cinchonæ et Hypophosphitum*—D. L. Cameron.—Clear, but slight deposit on sides and decided deposit on bottom of container; of light yellowish-brown color and unsatisfactory odor (like 42). (Base: elixir of cinchona.)

44. *Elixir Cinchonæ Detannatum*—D. L. Cameron.—Clear, insignificant deposit; of a light yellow color and good odor. (Base: arom. spirit, syrup and water, same as 42.)

45. *Elixir Cinchonæ et Ferri*—D. L. Cameron.—Clear, no deposit whatever; of a light greenish-olive color and satisfactory odor. (Base: detannated elixir of cinchona.)

49. *Elixir Cinchonæ, Ferri et Pepsini*—A. B. Stevens.—Clear, but slight deposit on sides and bottom of container; of a light brown color; the unsatisfactory condition being that of some pepsins. (Base: elixir of cinchona and iron.)

51. *Elixir Cinchonæ, Pepsini et Strychninæ*—A. B. Stevens.—Clear, with slight deposit; of light yellow color and unsatisfactory odor. (Base: elixir of pepsin.)

NOTE.—The color of elixir of pepsin (81) is brownish-red. In this preparation made from it, the color seems to be partly discharged and the preparation rendered otherwise unsightly. This is probably due to reaction between the alkaloids and the co. elixir of taraxacum in the elixir of pepsin.

54. *Elixir Eriodictyi Aromaticum*—L. F. Stevens.—Turbid, with slight deposit of brown color; of good odor. (Base: comp. elixir of taraxacum.)

57. *Elixir Eucalypti*—E. M. Wells.—Clear, with grey-brown deposit; of good odor. (Base: comp. elixir of taraxacum.)

58. *Elixir Euonymi*—E. M. Wells.—Clear, with slight deposit on sides; of a deep brown-red color and good odor. (Base: comp. elixir of taraxacum and syrup of coffee.)

59. *Elixir Ferri Hypophosphitis*—Jul. Kalisch.—Clear, with very slight deposit; of a light brown color and good odor. (Base: aromatic elixir.)

NOTE.—Ferric hypophosphite has evidently changed.

60. *Elixir Ferri Lactatis*—Julius Kalisch.—Clear, with a small amount of whitish crystalline deposit; of a deep brownish-yellow color and good odor. (Base: aromatic elixir.)

62. *Elixir Ferri Phosphatis, Cinchonidinæ et Strychninæ*—Jul. Kalisch.—Clear, with scarcely perceptible precipitate; of a deep olive-green color, and good odor. (Base: aromatic elixir.)

63. *Elixir Ferri Phosphatis, Quininæ et Strychninæ*—Jul. Kalisch.—Clear, with decided precipitate; of a very deep olive-green color, and good odor. (Base: aromatic elixir.)

64. *Elixir Ferri Pyrophosphatis*—Jul. Kalisch.—Clear, free from deposit, of a very light olive brown—almost yellow—color, and good odor. (Base: aromatic elixir.)

65. *Elixir Ferri, Quininæ et Strychninæ*—Jul. Kalisch.—Clear, with scarcely perceptible precipitate; of an olive-brown color, and good odor. (Base: aromatic elixir.)

66. *Elixir Frangulæ*—E. M. Wells.—Clear, but tolerably large deposit of a yellowish-brown color; of a deep brown color and good odor. (Base: aromatic elixir.)

67. *Elixir Gentianæ*—E. M. Wells.—Clear, free from deposit, of a light brown color, fluorescent, and of good odor. (Base: aromatic elixir.)

68. *Elixir Gentianæ et Ferri Phosphatis*—E. M. Wells.—Clear and bright, fluorescent, of a deep brown color, but musty odor. (Base: aromatic elixir.)

69. *Elixir Gentianæ cum Tinctura Ferri Chloridi*—Two samples: A., E. M. Wells; B., D. L. Cameron.

A., E. M. Wells.—Clear, but not bright, fluorescent, with scarcely perceptible deposit; of a light brown color, but somewhat darker than 67; of good odor.

B., D. L. Cameron.—Slightly turbid, with small but decided deposit; darker in color and fluoresence not so decided as in A. (Base: elixir of gentian.)

70. *Elixir Glycyrrhizæ*—E. M. Wells.—Clear, with scarcely perceptible deposit; of a deep brown color and good odor. (Base: aromatic elixir.)

71. *Elixir Glycyrrhizæ Aromaticum*—E. M. Wells.—Turbid, with considerable light brown deposit; of a light brown color and good odor. (Base: aromatic elixir.)

NOTE.—No. 71 is very inferior in appearance to No. 70. The latter is made from purified extract of liquorice, and rendered clear with ammonia water, while the aromatic elixir (No. 71) contains no ammonia, and is made with fluid extract of liquorice.

72. *Elixir Grindeliæ*—Chas. F. Schleussner.—Clear, with scarcely any deposit; of a brownish-red color and good odor. (Base: compound elixir of taraxacum.)

74. *Elixir Humuli*—Edwin H. Owens.—Slightly turbid, with a slight brown deposit on sides and bottom; of a deep red-brown color and good odor. (Base: aromatic elixir and a little compound elixir of taraxacum.)

76. *Elixir Hypophosphitum cum Ferro*—J. Blair.—Perfectly bright, of a faint yellowish color and fairly good odor. (Base: aromatic elixir.)

77. *Elixir Lithii Bromidi*—O. P. Hare & Co.—Turbid, with considerable precipitate; of a light reddish-brown color. (Base: adjuvant elixir.)

78. *Elixir Lithii Citratis*—Owens & Miner Drug Co.—Nearly clear, and free from deposit; of a light reddish-brown color and good odor. (Base: adjuvant elixir.)

NOTE TO 77 AND 78.—The keeping qualities of the two should be alike. The odor of the two differed decidedly.

79. *Elixir Lithii Salicylatis*—C. A. Santos (F. N. Masi).—Clear, with faint deposit; of a reddish-brown color, but darker than either 77 or 78; odor like 77, but not identical. (Base: adjuvant elixir.)

80. *Elixir Malti et Ferri*—C. A. Santos (W. B. Saul).—Turbid, with considerable precipitate on sides and bottom; of a brown color and good odor. (Base: aromatic elixir.)

81. *Elixir Pepsini*—A. B. Stevens.—Clear, nearly bright, and free from deposit; of a brownish-red color and fairly good odor.

82. *Elixir Pepsini, Bismuthi et Strychninæ*—A. B. Stevens.—Clear, with small whitish deposit; of a brown-yellow color and fairly good odor. (Base: elixir of pepsin and bismuth.)

83. *Elixir Pepsini et Bismuthi*—A. B. Stevens.—Opalescent, with small gray-white deposit covered on surface with portions of black-grey matter; of a very light olive-brown color and fairly good odor. (Base: a combination of glycerin, alcohol and syrup with a little compound elixir of taraxacum.)

84. *Elixir Pepsini et Ferri*—A. B. Stevens.—Clear, with insignificant deposit; color brownish-yellow, and odor fairly good. (Base: elixir of pepsin.)

NOTE TO 51, 81, 82, 83, 84.—The odor of all of these can be improved. The base in all is practically the same—identical in 51, 81 and 84—and, again, in 82 and 83. It is difficult to account for the difference in color and appearance of the preparation.

85. *Elixir Phosphori*—Chas. Rice.—Bright, clear, free from deposit, nearly colorless, and good odor. (Base: aromatic elixir.)

86. *Elixir Phosphori et Nucis Vomicæ*—Chas. Rice.—Bright, clear, free from deposit, nearly colorless, and good odor. (Base: elixir phosphori.)

87. *Elixir Picis Compositum*—C. A. Santos (W. B. Saul).—Turbid, with decided brown, pulverulent deposit; of a light brown color, and tarry odor. (Base: wine of tar.)

88. *Elixir Pilocarpi*—C. A. Santos.—Nearly clear, with slight deposit; of a deep brown color, and good odor. (Base: comp. elixir of taraxacum.)

89. *Elixir Potassii Acetatis*—J. Clifton Wheat, Jr.—Perfectly bright, of a faint straw color, and good odor. (Base: aromatic elixir.)

90. *Elixir Potassii Acetatis et Juniperi*—Robert Brydon.—Slightly turbid, with a small amount of resinous deposit; of a brown-yellow color, and good odor. (Base: aromatic elixir.)

91. *Elixir Potassii Bromidi*—S. D. Craik.—Nearly clear, but considerable deposit; of a deep brownish-red color, and well preserved odor. (Base: adjuvant elixir.)

NOTE. This preparation would not deposit, and would be improved in odor if it were made with aromatic elixir.

92. *Elixir Quininæ Compositum*—Chas. Rice.—Bright and clear, free from deposit, of a faint straw color, and good odor. (Base: aromatic elixir.)

95. *Elixir Rhamni Purshianæ*—E. L. Milhau.—Nearly clear, with slight deposit; of a deep brown color, and good odor. (Base: comp. elixir of taraxacum.)

96. *Elixir Rhamni Purshianæ Compositum*—E. L. Milhau.—Nearly clear, with slight deposit; of a deep brown color and good odor. (Base: a combination of co. tr. cardam., aromatic spirit, etc.)

NOTE. The odor of this is better than that of No. 95.

97. *Elixir Rhei*—E. L. Milhau.—Clear, with very slight yellow deposit; of red-brown color and agreeable odor. (Base: special.)

98. *Elixir Rhei et Magnesii Acetatis*—E. L. Milhau.—Nearly clear, but a decided brown deposit; of a deep red-brown color and good odor. (Base: aromatic elixir.)

NOTE.—The odor is not as pleasant as that of No. 97.

99. *Elixir Rubi Compositum*—E. L. Milhau. Turbid, with considerable red deposit; of a deep red color and good odor. (Base: blackberry juice and syrup.)

100. *Elixir Sodii Bromidi*—E. L. Milhau.—Nearly bright and free from deposit; of a very light yellow brown color and good odor. (Base: adjuvant elixir.)

101. *Elixir Sodii Hypophosphitis*—E. L. Milhau.—Perfectly bright, nearly colorless and of good odor. (Base: aromatic elixir.)

102. *Elixir Sodii Salicylatis*—E. L. Milhau.—Perfectly bright, of a very light salmon color and good odor. (Base: aromatic elixir.)

103. *Elixir Stillingiæ Compositum*—E. L. Milhau.—Nearly clear, with a faint deposit; of a brown color and very good odor. (Base: aromatic elixir.)

104. *Elixir Strychninæ Valerianatis*—E. L. Milhau.—Bright, clear, of a rose-red color and good odor. (Base: aromatic elixir.)

105. *Elixir Taraxaci Compositum*—S. J. Bendiner.—Slightly turbid, with very faint deposit; of a brown color and good odor.

106. *Elixir Turneræ*—Henry Schmid.—Almost clear, with very slight deposit; of a light brown color and good odor. (Base: aromatic elixir.)

107. *Elixir Viburni Opuli Compositum*—Henry Schmid.—Nearly clear, with decided but small, light brown deposit; of a deep red-brown color and good odor. (Base: comp. elixir of taraxacum.)

108. *Elixir Viburni Prunifolii*—Henry Schmid.—Turbid, with decided but small precipitate on sides and bottom of container; of a light reddish-brown color, and good odor. (Base: aromatic elixir and co. tincture of cardamom.)

109. *Elixir Zinci Valerianatis*—Henry Schmid.—Perfectly bright, of a light red-brown color, and good odcr. (Base: aromatic elixir.)

112. *Emplastrum Picis Liquidæ Compositum*—Lloyd Brothers.—A quite hard and brittle black mass, of brown resinous fracture.

NOTE. Seems deficient in adhesive qualities.

125. *Extractum Adonidis Fluidum*—J. P. Remington.—Practically clear and free from deposit; of a dark olive-green color.

126. *Extractum Aletridis Fluidum*—J. P. Remington.—Turbid, with small deposit; of a light red-brown color.

127. *Extractum Apii Graveolentis Fluidum*—J. P. Remington.—Clear, with an oily superstratum mixed with more or less yellowish flocculent matter, and a small portion of yellowish deposit on bottom of container; of a brown-red color.

129. *Extractum Apocyni Cannabini Fluidum*—J. P. Remington.—Clear, with a slight fawn-colored deposit; of a deep red-brown color.

130. *Extractum Araliæ Racemosæ Fluidum*—J. P. Remington.—Clear, with a slight oily (yellowish-brown) superstratum and slight fawn-colored deposit; of a deep red-brown color.

131. *Extractum Arnicæ Florum Fluidum*—J. P. Remington.—Clear deep brown-red fluid, with a slight oleoresinous superstratum, and a decided light fawn-colored deposit.

133. *Extractum Aspidospermatis Fluidum*—J. P. Remington.—A nearly clear, very dark red-brown fluid, with a decided brown deposit.

134. *Extractum Berberidis Vulgaris Fluidum*—J. P. Remington.—A nearly clear, very dark (yellowish) brown fluid, with a very small yellow deposit.

137. *Extractum Calendulæ Fluidum*—J. P. Remington.—A nearly clear, deep (yellowish) brown fluid, with a small oily superstratum, and a slight gray-brown deposit.

138. *Extractum Camelliæ Fluidum*—F. B. Power.—A clear, deep (red-) brown fluid, with a small, olive gray, caked deposit.

139. *Extractum Caulophylli Fluidum.*—J. P. Remington.—A clear, deep (red-)brown fluid, with a very slight brown deposit.

140. *Extractum Coffeæ Viridis Fluidum.*—F. B. Power.—A clear, dark (red-)brown fluid, with a decided light and fawn colored deposit.

141. *Extractum Coffeæ Tostæ Fluidum.*—F. B. Power.—A clear, dark brown fluid, with a very slight brown deposit, and of very good odor.

142(?). *Extractum Convallariæ Fluidum.**—F. B. Power.—A clear, dark brown fluid, with a green oily superstratum and a very small grey-brown deposit.

145. *Extractum Cornus Circinatæ Fluidum.*—J. P. Remington.—A clear, dark brown fluid, with a small but decided olive-grey deposit.

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*Labelled "Ext. Convallar. Fl."; therefore uncertain whether prepared from flower (142) or rhizome (143). C. L. D.

146. *Extractum Corydalis Fluidum.*—J. P. Remington.—A nearly clear, dark brown fluid, with insignificant deposit and suspended matter.

147. *Extractum Coto Fluidum.*—F. B. Power.—A clear, deep red-brown fluid, with small deposit of crystals.

148. *Extractum Eriodictyi Fluidum.*—J. P. Remington.—A bright, clear, deep olive-brown fluid, with scarcely any deposit.

149. *Extractum Ferri Pomatum.*—Theo. Louis.—The greater part leaked out of bottle; whether through fermentation or insecure stopper, unable to determine. What remained seems to be good.

150. *Extractum Fuci Fluidum.*—J. P. Remington.—A clear, dark olive-green fluid, with small, but decided, whitish deposit, evidently crystalline. (Saline matter?)

151. *Extractum Glycyrrhizæ Depuratum.*—C. A. Santos.—Apparently in well-preserved condition.

152. *Extractum Helianthemi Fluidum.*—J. P. Remington.—A clear, red-brown fluid, with a small, but decided, light fawn-colored deposit.

153. *Extractum Humuli Fluidum.*—J. P. Remington.—A clear, deep red-brown fluid, with very slight yellowish flocculent deposit; odor fairly good.

155. *Extractum Jalapæ Fluidum.*—J. P. Remington.—A nearly clear, brown fluid; the sides and bottom of container coated with a brownish film.

156. *Extractum Juglandis Fluidum*—J. P. Remington.—A clear, very dark olive-brown fluid, with a scarcely appreciable deposit.

167. *Extractum Scoparii Fluidum*—F. B. Power.—A clear, olive-brown fluid, with a slight deposit.

168. *Extractum Sennæ Fluidum Deodoratum*—F. B. Power.—A clear, deep-brown fluid, with an abundant smeary black deposit. Odor fairly good.

169. *Extractum Sterculiæ Fluidum*—F. B. Power.—A clear, brown-red fluid, with considerable caked, cinnamon-brown deposit.

172. *Extractum Turneræ Fluidum*—F. B. Power.—A clear, deep olive-brown fluid, with considerable deposit adhering to one side and bottom of container (deposited on side evidently while the bottle was in a horizontal position).

173. *Extractum Urticæ Fluidum*—J. M. Good.—A clear, deep reddish-brown fluid, with appreciable quantities of a dark cinnamon-brown deposit.

174. *Extractum Verbasci Fluidum*—J. M. Good.—A nearly clear, dark brown fluid, with some brown deposit on shoulder of bottle and on bottom.

175. *Extractum Verbenæ Fluidum*—J. M. Good.—A clear, dark-brown fluid, with a small deposit.

176. *Extractum Viburni Opuli Fluidum*—J. M. Good.—A clear, dark reddish-brown fluid, with scarcely any deposit.

177. *Extractum Zeæ Fluidum*—J. M. Good.—A somewhat turbid, brown fluid, with considerable dark fawn-colored precipitate.

178. *Ferri et Quininæ Citras Effervescens*—L. C. Hopp.—Two specimens: A., Powder; B., Granular.

A., A loose, dry, white powder: copiously and rapidly effervescent, forming a yellowish solution, with undissolved particles of ferric salt.

B., Handsomely granular, not coherent, of a light brownish color; slowly and imperfectly effervescent; solution perfect, but deep yellow.

180. *Ferri Phosphas Effervescens*—L. C. Hopp.—Two specimens: A., Powder; B., Granular.

A., A caked, somewhat tinged white powder; friable, but not separable by shaking; copiously and rapidly effervescent, forming a clear, faintly yellowish solution. A small amount of the ferric phosphate remains undissolved.

B., Distinct loose granules of a brownish color; copiously and rapidly effervescent,

forming a clear solution, deeper in color than A. A small amount of ferric phosphate remains undissolved.

181. *Gelatinum Chondri*—Chas. Rice.—Has kept well.

182. *Glyceritum Acidi Tannici*—Henry Schmid.—A bright clear, brownish-yellow, thick liquid, with small amount of greenish superstratum.

183. *Glyceritum Bismuthi*—Henry Schmid.—A perfectly bright, brownish-yellow liquid, with faint whitish deposit. Odorless.

184. *Glyceritum Boroglycerini*—Henry Schmid.—A perfectly bright, faint straw-colored, thick liquid.

185. *Glyceritum Hydrastis.*—A nearly clear, deep brown-red fluid, with small olive-green deposit.

186. *Glyceritum Pepsini*—A. B. Stevens.—A perfectly bright, deep straw-colored fluid, with a slight flocculent deposit, easily floating throughout the liquid. Odor not pleasant.

187. *Glyceritum Picis Liquidæ*—Chas. Rice.—A turbid, deep brown fluid, with a small black deposit on sides and bottom of container.

189. *Gossypium Stypticum*—Chas. F. Schleussner.—Condition apparently unchanged.

190. *Infusum Gentianæ Compositum Fortius*—Chas. F. Schleussner.—A turbid, brown liquid, with a slight fawn-colored deposit, and a fairly good odor.

192. *Iodoformum Aromaticum*—Chas. Rice.—Odor satisfactory.

195. *Linimentum Ammonii Iodidi*—C. R. Paddock.—A clear, orange-yellow liquid. Odor satisfactory.

NOTE.—The color would seem to indicate a change by age.

196. *Linimentum Iodi*—C. R. Paddock.—No evident change.

197. *Linimentum Opii Compositum*—C. R. Paddock.—The greater part of the contents of the bottle had leaked out, owing to partial destruction of the cork. Consider it probable that under ordinary circumstances it will keep well.

NOTE.—The addition of tincture of quillaya (N. F.), as suggested in the foot-note to the formula, is doubtless an improvement.

198. *Linimentum Saponato Camphoratum.*—C. R. Paddock.—Four samples were furnished in regular opodeldoc bottles, provided with rubber-stoppers. The contents of three of the bottles were perfectly preserved; the contents of the fourth had become pale yellowish, but it was noticed that in this case the stopper was imperfect.

199. *Linimentum Terebinthinæ Aceticum*—C. R. Paddock.—A partially separated emulsion, but easily re-emulsionized by shaking, forming a uniform, white creamy mixture.

200. *Linimentum Tiglii*—C. R. Paddock.—A light yellow, perfectly bright liquid.

201. *Linimentum Tiglii Compositum*—C. R. Paddock.—A perfectly bright, light yellow liquid.

202. *Liquor Acidi Phosphorici Compositus*—Emlen Painter.—A perfectly bright, nearly colorless liquid, with very small amount of crystalline deposit.

203. *Liquor Aluminii Acetatis*—Emlen Painter.—A clear, colorless fluid, with an abundant white deposit.

204. *Liquor Aluminii Acetico-Tartratis*—Emlen Painter.—A clear fluid, free from deposit, but of a deep yellow color.

205. *Liquor Ammonii Acetatis Concentratus*—Emlen Painter.—An absolutely clear and bright, nearly colorless liquid, of faint acetic odor.

206. *Liquor Ammonii Citratis Fortior*—Emlen Painter.—A clear and nearly colorless liquid.

207. *Liquor Bismuthi*—Emlen Painter.—A clear—only faintly opalescent—colorless liquid, with insignificant deposit. Odor faintly alcoholic.

210. *Liquor Carmini*—Chas. Rice. A clear fluid, with scarcely any deposit, and of excellent color.

211. *Liquor Coccineus*—Chas. Rice.—A well-colored fluid, but contained considerable deposit.

214. *Liquor Extracti Glycyrrhizæ*—Chas. Rice.—A clear, intensely deep brown liquid, free from deposit, and of good odor.

215. *Liquor Ferri Hypophosphitis*—F. B. Power.—A clear, olive-green fluid, with very slight deposit.

NOTE. The color indicates a slight change.

216. *Liquor Ferri Iodidi*—F. B. Power.—A perfectly bright, light emerald-green fluid.

217. *Liquor Ferri Oxysulphatis*—F. B. Power.—A bright, deep straw-yellow fluid, free from deposit.

218. *Liquor Ferri Protochloridi*—F. B. Power.—A bright, greenish fluid with a faint yellowish tinge, but free from deposit.

NOTE. There is evidently a slight change by oxidation.

219. *Liquor Hydrargyri et Potassii Iodidi.*—Chas. F. Schleussner.—A bright, clear, nearly colorless fluid, with a very faint deposit of a yellow color.

220. *Liquor Hypophosphitum.*—Chas. F. Schleussner.—A bright, clear, absolutely colorless fluid; free from deposit.

221.—*Liquor Iodi Carbolatus*—Chas. F. Schleussner.—A bright, clear, colorless fluid, with insignificant brownish deposit.

222. *Liquor Iodi Causticus.*—Chas. F. Schleussner.—In apparently unchanged condition.

223. *Liquor Magnesii Bromidi.*—Chas. F. Schleussner.—A clear colorless fluid, with insignificant deposit.

224. *Liquor Morphinæ Citratis.*—Chas. Rice.—A clear, light red-colored fluid, with a small deposit.

225. *Liquor Morphinæ Hypodermicus.*—Two specimens: A., in blue poison bottle; B., Chas. Rice. In flint bottle.

*A.* A clear faint straw-colored fluid, with a small deposit.

*B.* A clear brownish straw-colored fluid, with a small deposit.

226. *Liquor Pancreaticus.*—A. B. Stevens.—A clear, pale straw-colored fluid, with slight flocculent deposit.

227. *Liquor Pepsini Aromaticus.*—A. B. Stevens.—A slightly opalescent, very pale straw-colored fluid, of good odor.

228. *Liquor Phosphori.*—Chas. Rice.—A bright, nearly colorless fluid, of good odor.

230. *Liquor Potassæ Chloratæ.*—C. S. Hallberg.—Spoiled.

232. *Liquor Saccharini.*—Chas. Rice.—A bright fluid, of a lemon-yellow color.

233. *Liquor Seriparus.*—J. U. Lloyd.—A bright, faint straw-colored fluid, with a small deposit.

235. *Liquor Sodii Boratis Compositus.*—Chas. Rice.—An opalescent, slightly colored fluid, having a very small, fawn-colored deposit.

237. *Liquor Sodii Citratis.*—Chas. Rice.—A bright, colorless fluid, without a trace of deposit or change.

239. *Liquor Sodii Oleatis.*—Emlen Painter.—A clear yellow fluid, having a very bulky—but apparently imponderable—mass, floating in its centre.

240. *Liquor Strychninæ Acetatis.*—Chas. Rice.—A bright salmon-colored fluid, with an insignificant deposit.

241. *Liquor Zinci et Ferri Compositus*—Chas. Rice.—A clear, very pale emerald-green fluid, with slight deposit on sides, and small but more decided deposit on bottom of bottle.

242. *Liquor Zingiberis*—L. F. Stevens.—A turbid, yellowish fluid, with brownish deposit. The odor is not satisfactory, and has evidently changed. The taste is quite pungent.

254. *Mistura Chloroformi et Opii*—Chas. Rice.—A very dark, black-brown fluid, with considerable deposit. Odor is good.

260. *Mistura Olei Picis*—T. D. McElhenie.—A dark brown, tolerably clear fluid, with a decided deposit.

267. *Mucilago Dextrini*—Chas. Rice.—A solid fungoid mass.

269. *Olea Infusa*—T. D. McElhenie.—The typical sample prepared is

*Oleum Stramonii Infusum.*—A clear, olive-brown liquid, with a small deposit.

270. *Oleatum Aconitinæ*—Emlen Painter.—A very light brownish fluid, clear, with insignificant deposit.

271. *Oleatum Plumbi*—Emlen Painter.—A plaster-like mass, of good consistence, slightly hardened and somewhat discolored on the outside.

272. *Oleatum Quininæ*—Emlen Painter.—A clear, but deep brown-red fluid, evidently decidedly changed.

273. *Oleatum Zinci*—Emlen Painter.—A granular, greyish-white, powdery mass, having a moist appearance.

278. *Pancreatinum*—A. B. Stevens.—A nearly white (slight fawn-colored), perfectly dry and odorless powder, which responded to the peptonizing test given in the *note* to the formula.

280. *Pepsinum Aromaticum*—Chas. F. Schleussner.—A damp, light brownish-white powder. Evidently in a bad condition.

304. *Potassii Bromidum Effervescens*—L. C. Hopp.—Two specimens: A., powder; B., granular.

A. A pure white, caked, somewhat damp, but friable powder; very slowly and imperfectly effervescent. Solution perfect.

B. In white, loose (not caked) granules; slowly and imperfectly effervescent. Solution perfect and colorless.

305. *Potassii Bromidum Effervescens cum Caffeina.*—Two specimens: A., powder; B., granular.

A. A pure white, slightly caked powder, easily separable by shaking. Effervescence is perfect, and the solution complete and colorless.

B. Nearly white, distinct and easily separable granules. Effervescence extremely slow and imperfect. Solution complete and colorless.

306. *Potassii Citras Effervescens*—L. C. Hopp.—Two specimens: A., Powder: B., Granular.

A. A white caked, somewhat damp powder; effervescence fairly good; solution colorless and complete.

B. White, caked granules, easily separable by shaking; effervescence fairly good; solution colorless and complete.

315. *Pulvis Iodoformi Dilutus*—Chas. Rice.—A very light, pale-yellow powder.

319. *Pulvis Pepsini Compositus*—C. S. Hallberg.—A damp, brown, powdery mass, of decided and unpleasant animal odor.

322. *Sal Carolinum Factitium*—L. C. Hopp.—A pure white, dry powder, perfectly soluble in water, forming a colorless solution.

323. *Sal Carolinum Factitium Effervescens*—L. C. Hopp.—Two specimens: A., Powder; B., Granular.

A. A pure white, somewhat caked powder, easily shaken asunder; effervescence moderately good; solution colorless and complete.

B. Creamy-white granules, slightly caked but easily skaken asunder; effervescence very sluggish; solution colorless and complete.

324. *Sal Kissingense Factitium*—L. C. Hopp.—A pure white, dry powder, forming a milky solution with water that does not clear readily with carbonic acid water.

325. *Sal Kissingense Factitium Effervescens*—L. C. Hopp.—Two specimens: A., Powder; B., Granular.

A. A white, damp, caked powder; effervesces fairly well, forming a colorless, nearly clear, opalescent solution.

B. Cream-white granules, easily shaken asunder, not damp; effervesces well, forming a slightly colored, opalescent solution.

326. *Sal Vichyanum Factitium*—L. C. Hopp.—A pure white, dry powder, forming a faintly opalescent, colorless solution.

327. *Sal Vichyanum Factitium Effervescens*—L. C. Hopp.—Two specimens: A., Powder; B., Granular.

A., A nearly dry, loose, white powder; effervesces well, forming a colorless, nearly bright solution.

B. Cream-white, dry granules, effervescing fairly well, but not as well as A. Solution colorless and nearly clear.

328. *Sal Vichyanum Factitium Effervescens cum Lithio*—L. C. Hopp.—Two specimens: A., powder; B., granular.

A. A cream white, nearly dry or slightly damp powder, effervescing moderately well, and forming a colorless, nearly clear solution.

B. White, separate granules, effervescing well, and forming a colorless, nearly clear solution.

335. *Spiritus Acidi Formici*—T. D. McElhenie.—A bright, colorless liquid.

336. *Spiritus Amygdalæ Amaræ*—T. D. McElhenie.—A bright, nearly colorless liquid, of perfect odor.

337. *Spiritus Aromaticus*—Chas. Rice.—A bright, faint straw-colored liquid, of excellent odor.

338. *Spiritus Aurantii Compositus*—Chas. Rice.—A bright liquid, of light yellowish straw color, and excellent odor.

339. *Spiritus Cardamomi Compositus*—T. D. McElhenie.—A slightly opalescent, faint straw-colored liquid, free from deposit, and of excellent odor.

340. *Spiritus Curassao*—Chas. Rice.—A bright, straw-colored liquid, of excellent odor.

343. *Spiritus Ophthalmicus*—T. D. McElhenie.—A bright, straw-colored liquid, of excellent odor.

344. *Spiritus Phosphori*—Chas. Rice.—A bright, colorless liquid, having the odor of phosphorus, but a faint acid reaction.

345. *Spiritus Saponatus*—T. D. McElhenie.—A bright, yellow fluid, with a yery slight white deposit.

346. *Spiritus Sinapis*—T. D. McElhenie.—A bright, nearly colorless liquid, having the odor of volatile mustard oil.

350. *Syrupus Acidi Hydriodici Decolor*—Emlen Painter.—A slightly turbid, light brown syrup, with a small dark brown precipitate. Evidently changed.

NOTE.—In my hands this syrup keeps well for a reasonable time.—C. L. D.

354. *Syrupus Calcii Chlorhydrophosphatis*—Chas. Rice.—A slightly turbid, light brown liquid, with small dark brown deposit.

355. *Syrupus Calcii et Sodii Hypophosphitum*—E. L. Milhau.—A bright, nearly colorless syrup.

356. *Syrupus Calcii Hypophosphitis.*—E. L. Milhau.—A bright, faint, straw-colored syrup.

357. *Syrupus Calcii Iodidi.*—E. L. Milhau.—A bright, pale, straw-colored syrup.

360. *Syrupus Cinnamomi.*—E. L. Milhau.—A perfectly bright, deep brown-red syrup, of good odor.

361. *Syrupus Eriodictyi Aromaticus.*—L. F. Stevens.—A turbid brown syrup, with considerable crystalline sugar deposit; of good odor.

362. *Syrupus Ferri Arseniatis.*—E. L. Milhau.—This had evidently fermented and the contents had partly leaked out (over one-half). It was nearly clear, of a yellow color, but had a considerable fungoid layer on the surface.

363.—*Syrupus Ferri Citro-Iodidi.*—F. B. Power.—A clear, but deep brown syrup. Evidently changed.

364. *Syrupus Ferri et Mangani Iodidi.*—F. B. Power.—A clear, pale, straw-colored syrup, with a slight fawn-colored deposit.

365. *Syrupus Ferri Hypophosphitis.*—Jul. Kalisch.—A perfectly bright, but light brown syrup; evidently changed.

366. *Syrupus Ferri Lactophosphatis.*—Jul. Kalisch.—A nearly clear, pale brown syrup, with slight deposit.

367. *Syrupus Ferri Protochloridi.*—F. B. Power.—A bright, clear syrup, nearly colorless, with a greenish tinge.

368. *Syrupus Ferri Saccharati Solubilis.*—Chas. Caspari, Jr.—A clear, very deep brown syrup.

369. *Syrupus Glycyrrhizæ.*—Chas. Rice.—A clear, deep brown syrup.

370. *Syrupus Hypophosphitum Compositus.*—C. A. Rapelye.—A clear, deep straw-yellow syrup, with a slight deposit.

371. *Syrupus Ipecacuanhæ et Opii.*—C. A. Rapelye.—A slightly turbid, light brown syrup, with a slight deposit.

372. *Syrupus Mannæ.*—C. A. Rapelye.—A clear, straw-yellow syrup, with considerable saccharine deposit.

373. *Syrupus Morphinæ Compositus.*—C. A. Rapelye.—A somewhat turbid brown, viscous syrup.

375. *Syrupus Papaveris.*—Chas. Rice.—A nearly clear, deep brown syrup.

376. *Syrupus Pectoralis*—Chas. Rice.—A nearly colorless, somewhat turbid syrup, but free from deposit and of good odor.

377. *Syrupus Phosphatum Compositus*—Chas. Rice.—A deep brown-red, turbid syrup, with slight deposit.

380. *Syrupus Sanguinariæ*—Chas. Rice.—A red, turbid, rather unsightly syrup, with a slight deposit.

381. *Syrupus Sennæ Aromaticus*—Chas. Rice.—A deep black-brown, fairly clear syrup, with a decided deposit. Odor not satisfactory.

382. *Syrupus Sennæ Compositus*—Chas. Rice.—A deep brown, clear syrup, with some deposit; of good odor.

384. *Syrupus Stillingiæ Compositus*—Chas. Rice.—An absolutely bright, deep brown-red syrup, of good odor.

385. *Talcum Purificatum*—J. M. Good.—Condition good, but has a slight odor.

388. *Tinctura Amara*—Chas. Caspari, Jr.—A clear, brown colored tincture, with insignificant precipitate; of good odor.

389. *Tinctura Antacrida*—Chas. Caspari, Jr.—A clear, brown tincture, with insignificant precipitate, and of good odor.

390. *Tinctura Antiperiodica*—Chas. Caspari, Jr.—Two specimens: 1, without aloes; 2, with aloes.

1. *Without Aloes.*—A slightly turbid, light brown tincture, with small deposit and of good odor.

2. *With Aloes.*—A nearly clear, deep brown tincture, with small deposit, and of good odor.

391. *Tinctura Aromatica*—Chas. Caspari, Jr.—A nearly clear, deep brown-red tincture, with insignificant deposit, and of good odor.

392. *Tinctura Capsici et Myrrhæ*—Chas. Caspari, Jr.—A clear, very light brownish tincture, with inappreciable deposit.

393. *Tinctura Cinchonæ Detannata*—D. L. Cameron.—A clear, light brownish-yellow tincture, with insignificant deposit.

394. *Tinctura Coto*—Chas. Caspari, Jr.—A clear, red tincture (with brownish tinge), with no deposit of consequence.

395. *Tincturæ Aethereæ*—Chas. Caspari, Jr.—Two examples: Belladonna and digitalis. Both deep olive-green in color, clear, and free from deposit.

396. *Tinctura Ferri Chloridi Ætherea*—Emlen Painter.—A bright, clear, olive-green tincture.

397. *Tinctura Ferri Citro-Chloridi*—Chas. Rice.—A bright olive-green tincture, clear, but with a large, caked, white deposit.

398. *Tinctura Ferri Pomata*—Theo. Louis.—A nearly clear, blackish-brown tincture, with a small deposit.

399. *Tinctura Guaiaci Composita*—M. L. Woodman.—A clear, deep brown-red tincture, free from deposit, and of good odor.

400. *Tinctura Iodi, Churchill*—Chas. Rice.—Satisfactory.

401. *Tinctura Iodi Decolorata*—M. L. Woodman.—A clear, straw-colored tincture. Satisfactory except as to odor, which is slightly alliaceous.

402. *Tinctura Jalapæ*—M. L. Woodman.—A light red-brown, clear tincture, with insignificant deposit.

403. *Tinctura Jalapæ Composita*—M. L. Woodman.—A clear, brownish-yellow tincture, with a small deposit.

404. *Tinctura Kino Composita*—M. L. Woodman.—A clear, deep red tincture, with considerable cinnamon-brown deposit.

406. *Tinctura Pectoralis*—Chas. Rice.—A clear, deep brown tincture, with a decided deposit.

407. *Tinctura Persionis*—Chas. Rice.—A clear, deep rose-red tincture, free from deposit.

408. *Tinctura Persionis Composita*—Chas. Rice.—A clear, deep red-brown tincture, free from deposit.

411. *Tinctura Rhei Aquosa*—C. S. Hallberg.—A clear, deep red-brown tincture, with insignificant deposit.

412. *Tinctura Rhei et Gentianæ*—C. S. Hallberg.—A clear, red-brown tincture, with a decided yellow deposit.

413. *Tinctura Rhei Vinosa*—C. S. Hallberg.—A clear, red-brown tincture, with decided brown deposit.

414. *Tinctura Saponis Viridis Composita*—C. S. Hallberg.—A clear, red brown tincture.

416. *Tinctura Tolutana Solubilis*—C. S. Hallberg.—A clear, pale orange-yellow tincture, with insignificant deposit, and of good odor.

417. *Tinctura Vanillini Composita.*—Chas. Rice.—Two specimens; both bright, clear, of good odor, the one of a pale brown-red color, the other a shade darker.

418. *Tinctura Zedoariæ Amara.*—C. S. Hallberg.—A clear, deep yellowish brown tincture, with considerable gelatinous deposit.

424. *Vinum Aurantii.*—Jul. Kalisch.—A clear, sherry-colored liquid, with some deposit on sides and bottom of bottle, and of fair odor.

425. *Vinum Aurantii Compositum.*—Jul. Kalisch.—A somewhat turbid, brown-red liquid, with considerable deposit, and of fair odor.

426. *Vinum Carnis.*—Jul. Kalisch.—A clear, brown-red liquid, with a small deposit, and of good odor.

427. *Vinum Carnis et Ferri.*—Jul. Kalisch.—A nearly clear, deep red-brown liquid, with a faint deposit, and of good odor.

428. *Vinum Carnis, Ferri et Cinchonæ.*—Jul. Kalisch.—A nearly clear, deep red-brown liquid, with a small deposit, and of good odor.

429. *Vinum Erythroxyli.*—Jul. Kalisch.—A clear, reddish-brown liquid, with a slight deposit, and of good odor.

430. *Vinum Erythroxyli Aromaticum.*—Jul. Kalisch.—A turbid, reddish-brown liquid, with a small deposit, and of a good odor.

431. *Vinum Fraxini Americanæ.*—J. U. Lloyd.—A clear, light brownish-red liquid, with a decided deposit, and of good odor.

432. *Vinum Pepsini.*—A. B. Stevens.—An opalescent, brownish-yellow liquid, with a small dark deposit, and of good odor.

433. *Vinum Picis.*—Jul. Kalisch.—A clear, brownish-orange-yellow liquid, with a small brown deposit on sides and bottom of bottle.

434. *Vinum Pruni Virginianæ.*—Jul. Kalisch.—A clear, bright-red liquid, with considerable encrusted deposit on sides and bottom of bottle, and of fair odor.

435. *Vinum Pruni Virginianæ Ferratum.*—Jul. Kalisch.—A nearly clear, deep yellow-brown liquid, with considerable cinnamon-brown deposit, and of unsatisfactory odor.

# MINUTES

OF THE

# SECTION ON COMMERCIAL INTERESTS.

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FIRST SESSION—FRIDAY MORNING, JULY 15.

The Section was called to order at 10:30 by W. H. Torbert, Chairman of the Section; Arthur Bassett, Secretary, occupied his position at the desk.

The Chairman read the following address:

GENTLEMEN: The year that has intervened since our last annual meeting has been a campaign of education; for that campaign, for the wide dissemination of its facts and data, we are indebted to the pharmaceutical press. The pharmaceutical press has fought a good fight, and we trust henceforth for it there is laid up a crown of generous patronage from the retail pharmacists of this country. Surely the pharmacists of America, from the consideration of their own interests, should see to it that the pharmaceutical press is sustained; for in every future contest with those opposing the interests of pharmacy, the pharmaceutical press must lead the pharmaceutical hosts. To-day, in these mountains of physical beauty and grandeur, we find ourselves in a veritable mountain of pharmaceutical delight. From these eminences the American Pharmaceutical Association shall consider the interests of pharmacists every whither. There is no interest of pharmacy so insignificant, or no pharmacist so obscure, but they shall receive the careful consideration of this body. During this year there have arisen a large number of questions which this Commercial Section is called upon to consider. Let me briefly mention a few; others will be presented by correspondence, and others will be suggested by various members through papers and discussions.

As one of my predecessors has said, "All attempts to abate the tax on alcohol at present seem futile." Mutual drug insurance, though long discussed, has not proven a success, as exemplified by the Mutual Wholesale Drug Insurance Company, which has retired. That is emphasized truth which has been frequently stated, that it requires great expert ability to conduct the insurance business. This is an age of specialties. Men of one idea taking a particular field are they who make the bold successes.

We demand expertness, ability and preparation as prerequisites of admission into the ranks of pharmacy. Let us illustrate our principles by leaving the domain of insurance to insurance men, who are thoroughly equipped to meet the intricate problems of fire insurance.

The State Medical Society of Pennsylvania has requested the repeal of the law which

allows every physician to become a registered pharmacist. By wise methods and fair representation of this action of the Pennsylvania Medical Society, no doubt other states with similar laws would follow. The Paddock drug and food deal, while in effect touching the commercial interests of Pharmacy, it has seemed to me the proper place for its consideration in the Section of this Association which traverses legislation, and, I trust, in that Section the views of the A. P. A. will be asserted in no uncertain sound. In many states there are laws enacted by the state and municipalities with reference to the sale of liquor for medicinal purposes, which work a great hardship and great injustice to pharmacists. In some states they are so severe and rigorous that a pharmacist cannot sell liquor and maintain his own self-respect or the respect of others, and the result of such legislation touches in many ways the commercial interests of pharmacy. I trust the Legislative Section will assert itself emphatically with reference to such laws showing that this Association is for the repeal of every law which bears down, with unjust severity, upon the interest of any pharmacist anywhere. The pharmacists of the United States are to-day turning with eager eye and anxious ear to the deliberations and intensely important question of the cut-rate problem. When the Commercial Section of the A. P. A. was established there were some who doubted its wisdom, but I think all have come to recognize this fact, that however much we would wish to exalt pharmacy along scientific lines in investigation and research, with reference to its Materia Medica, its infinite chemical combinations, its ever widening and attractive interests in the realms of botany, in establishing better and broader foundations for our Schools of Pharmacy, in determining that only men shall be selected for professors in our Schools of Pharmacy of the most thorough equipment in intellectual resources, with ample and special training for the specialties which they are to teach, we must come back to the primal and fundamental proposition, that for all these there will be little use or occasion unless those who graduate at our Schools of Pharmacy and who are attracted by the science of pharmacy shall find the business of the pharmacist, for which they have been qualified, fairly remunerative, or equally so with other lines of business effort. In my judgment the A. P. A. wisely reached this conclusion, and made it the special function of this Commercial Section to lay broad and deep the highest commercial interests of pharmacy everywhere, to protect them from unwise competition from within their ranks, and from unjust and iniquitous competition from without.

To-day, as never before, the pharmacists of this country are recognizing and appreciating the expenditure of time and of money, and the careful thought of the entire membership of this Association, to solve the serious problems that are to-day confronting the commercial interests of pharmacy; and if not overcome and successfully resisted every school of pharmacy, every teacher of pharmacy, every pharmacist, will be like Othello—with an occupation gone; therefore, I invite the careful and deliberate consideration of this Commercial Section to the cut-rate problem. I shall briefly rehearse to you the work accomplished, recording the apparent temporary failure of our effort, but which I tell you in all candor and seriousness is simply an incident before the final triumph. With pharmacists whose aim is right, whose object is just, in their lexicography there is no such word as fail. Delays encountered, obstacles to overcome, only intensify their determination and assure ultimate success.

*Cut Rate Problem.*—The A. P. A. plan is now known by all pharmacists. It has been approved by wholesalers, by proprietors, by numerous State associations, by the interstate league, by retailers and by lawyers in many states. But, unfortunately, it was found to be in conflict with the anti-trust laws in the mind of some lawyers. This latter fact has been the stumbling block in the way of its success and adoption. Under the above general head let me retrace the work done since our last annual meeting in connection with this plan. President Finlay appointed a special committee to go to Louisville to confer with wholesalers and proprietors. The Chairman of the Committee will report to

you the details of that conference. Suffice it for me to say, the subject was thoroughly discussed for two days, occupying the principal part of the time the two Associations were in session. A few changes in the plan were proposed and accepted by your representatives; the more important one striking out the substitute clause. The A. P. A. plan is unanimously accepted and endorsed by the National Wholesale Drug Association and by the Proprietors' Association, showing how carefully and well the plan had been prepared by this body. The Tripartite Committee was selected—three from the Proprietors, three from the Wholesalers, and three representatives from this Association. This Committee met in New York in December, and selected Mr. Henry Canning as Chairman and Mr. M. N. Kline as Secretary. In my judgment, a wiser selection than Mr. Canning for Chairman could not have been made. The honesty of his purpose has not been, nor cannot be, questioned in any quarter. After considerable discussion, owing to the unavoidable absence of two members it was thought best to adjourn until all could be present. The second meeting was called in New York, January 20th, and all members were present. After a careful discussion of each article of the A. P. A. plan, the Committee unanimously resolved to submit the plan to the retailers for approval, when twenty proprietors should accept it, and it should be found to be legal. If found legal, and accepted by twenty proprietors and approved by retailers, it was to be put in active operation. The unexpected happens: lawyers were found who claimed it interfered with the anti-trust laws; twenty proprietors were never found who would accept it; and some of the seventeen who had accepted it withdrew when the legal objections were raised. Mr. Kline, Secretary of the Committee, issued a circular letter to the Committee, setting forth the facts as above stated, requesting from the Committee further instructions. The Committee were opposed to urging the proprietors to put the plan in operation in spite of legal objections, and the fact that less than twenty proprietors might be willing to do so. It was also objected, that it changed the basis decided upon in New York by the Committee. The latter objection was, of course, immaterial, as it was clearly a prerogative of the Committee to reverse itself or modify its position. In view of the alleged legal objections, therefore, the plan is not in operation, and the practicable question that confronts us is, "What shall we do, and how shall we do it?" Before answering these two questions as it occurs to your Chairman, let me say that some have inquired and wondered why it was proposed to submit it to the retailers for approval. It was unanimously believed by the Committee that no plan can be made a success of which they do not approve, and to which they will not lend their co-operation to put it in effect. It was found that many of the cutters in New York and elsewhere were getting their supply through retailers of Hood's Sarsaparilla, when Mr. Hood was doing everything he could to keep the Sarsaparilla out of the cutters, and raised the price of it to one dollar, with a limit of eighty-five cents, at which it might be sold. This feature was an advantage only to larger cities, like Boston and New York, as it raised the price of Hood's Sarsaparilla to retailers there from sixty-eight cents to eighty-five cents. But the retailers generally construed it to mean the privilege of selling it at eighty-five cents, and they were largely against the Hood's Sarsaparilla plan, though Mr. Hood had made it in all sincerity to help the retailers. This fact evidenced to your Committee the desirability of having retailers generally approve the plan. But with the general expression of approval of the plan by retailers, as represented by the A. P. A., and so many state associations approving it, since particularly the Iowa State Pharmaceutical Association has recommended that this feature of the plan be omitted, my own mind has come into an acceptance that the view of the Iowa Association is a wise one. I would recommend that this Section approve of the favorable consideration of this feature to those to whom the execution of the plan may be intrusted; I sincerely believe that every member of that Committee has the most sincere sympathy for the retailers' interests. I believe that the representatives on that Committee from the Wholesalers' and Proprietors' Associations were as

honest and earnest in their desire to promote the retailers' interests as your own representatives, and I should regard it unfortunate in the discussion that ensues here if any invidious criticism were made as between members of that Committee. In whatever the Committee may have failed or in whatever they have acted unwisely, let your criticism bear equally upon every member of the Committee; and if there be more severity upon one member than another, courtesy would demand for the representatives of sister Associations that the severer criticism fall upon your own representatives. In the future development of this problem, nothing is to be gained by asperity or unwise criticism. Let us work together in harmony with the representatives of other associations, minimizing, so far as we may be able, the points in which we differ, and solidifying on the points on which we agree. While I have thus indicated to you my estimate of the Committee, you will understand that good men and honest men may differ. We must all concede that if the legal opinion, alleging a conflict with the anti-trust laws, was the final determined judgment of the superior court of last resort, it would inflict a hardship upon proprietors; or if every retailer who made sales under the A. P. A. plan was annoyed with threatened prosecution for offending against anti-trust laws, it would be alike an annoyance to the proprietor and retailer.

But to the inquiry, "What shall we do, and how shall we do it?" your Chairman would recommend that this Association affirm its position in this wise: that as the proprietors had voluntarily offered to accept any practical plan which the A. P. A. should approve, and as the plan which the A. P. A. has formulated has been approved by the proprietors, by the wholesalers, by many state associations of retail druggists, and as legal opinions are in conflict as to whether the plan conflicts with the anti-trust laws or not; as the attorneys claim there is such an interference with the anti-trust laws, in practicable operation it is doubtful if the plan would be interfered with; and as a preponderance of legal opinion is that the plan is not in such conflict: let the American Pharmaceutical Association take the bold stand and recommend that proprietors put the plan in force promptly, and omit the delay in the submission of it to retailers for approval, as that approval is already practically secured in the recommendations which have been made by State Associations from Maine to California. The only other alternatives are to recommend that each proprietor put the plan in operation for himself, or abandon the field to the cutter. Of course the first alternative will make an almost insurmountable amount of work for wholesalers and retailers, but it is better this wise than to have one-third of the sales of retail pharmacists without profit. The second alternative, I take it, would receive no considerable favor in this body. You have no doubt all recently noted that the attorneys having the cases against the whiskey trust at Boston have stated that it would be impossible for them to secure a verdict against the whiskey trust, or to establish that its operations were in such conflict as to accomplish "a restraint of trade." I submit to this intellectual body that if the operations of the whiskey trust are so inoffensive and do not accomplish a restraint of trade, it is absurd to assume that the proprietors may not, with other proprietors, constitute agencies for the selling of their proprietary articles at wholesale and retail, and insist that in all such appointed agencies the retail prices of their respective articles be maintained. This is not a combination of proprietors to fix prices over some articles produced by different manufacturers, but a method of convenience to simplify the work and details so that each proprietor by the united plan simply governs and controls the price of his own articles; and to my mind and to the mind of such legal attorneys as I have consulted, there should be no fear of the result in any of the higher courts. "Surely," as the National Druggist puts it, "no other men with equal interest at stake and with the preponderance of legal opinion in their favor would hesitate to put the plan in operation and defend it in the courts." Let us advise the proprietors to put the plan in operation, and make a test case if any resist. We certainly will obtain and maintain the respect among men for the courage of our con-

victions, and our courage to protect and defend those who are depending upon this Association for protection and defence. For ten years proprietors have fixed prices at which their preparations were sold by wholesalers, and they have cut off those who would not adhere to their conditions; and there is not a record in any court in this country of a complaint of its being against anti-trust laws. Dr. Pierce, president of the Proprietors' Association, in a letter to your chairman, positively asserts in this language, "I never had any fear of the legal consequences of such a step. If twenty of the leading proprietors would go in earnestly, I believe success would crown our efforts."

With this hasty and imperfect summary of the situation, I leave the matter in your hands, with entire confidence that you will act wisely and well.

On motion of Mr. Fennel, the address was received and referred to a committee of three for consideration. The chair appointed Messrs. Fennel, Sloan and Alexander said committee.

The next business in order being the reading of communications, the secretary read the following:

DENVER, COLO., *May* 14, 1892.

*To the American Pharmaceutical Association:*

The Colorado Pharmacal Association suggests that the annual tax of $25 imposed upon Druggists for the purpose of retailing liquors for medicinal use and distilled spirits for mechanical purposes is an exceedingly unjust one, and we appeal to the American Pharmaceutical Association to lay this matter before our national legislative bodies in its proper light, and make every effort to have this humiliating stigma on our profession removed.

Respectfully, FELIX A. LYNEMAN, *Secretary.*

LITTLE ROCK, ARK. *June* 23, 1892.

*Extract from Minutes of this day's Proceedings of The Arkansas Association of Pharmacists.*

"*Whereas,* The Patent, or rather the Copy-Right Laws of our Country give protection to foreign as well as local manufacturers, not alone as to the *name* of the product; but also to the very *process of manufacture* itself, whereby they are secured in the sale of remedies and so called "Newly Discovered" Chemicals, to the great detriment of the Medical and Pharmaceutical Professions as well as of the people at large; therefore be it

*Resolved,* That it is the sense of this Association, that the American Pharmaceutical Association be asked to memorialize the Congress of the United States, urging the repeal of all Copy-Right Laws, which protect the *name* or the *process of manufacture,* of any and all Chemicals and Remedies, used for the relief of human suffering, which are put up and recommended to the use of Physicians and others, no matter under what name or form, except those agents known as Patent or Proprietary Remedies, with Doses, Directions for use, Certificates of Cure, attached or accompanying."

J. W. BEIDELMAN, *Secretary of Arkansas Association of Pharmacists.*

GRAND RAPIDS, *June* 25, 1892.

*To the American Pharmaceutical Association:*

We as members and in behalf of the Michigan State Pharmaceutical Association beg leave to request of the American Pharmaceutical Association that it submit for discussion at its meeting in July the subject of cutting on proprietary goods. We would also recommend that the A. P. A. request of proprietors and wholesale jobbers that they formulate and put into force some method by which this class of goods may be prevented from falling into the hands of the cutter. As the evil of cutting on such goods is rapidly increasing and seriously menaces the retail drug trade, we appreciate that some plan

must be adopted to remedy it; otherwise, the inducement to keep these goods in the stock of the retail druggist will be removed. We as members of the retail drug trade claim this protection from proprietors as our right, and in case it be refused believe the retail druggist should cease to sell or deal in such proprietary medicines as may be found in the cut-rate stores. We further believe he should adopt all honorable methods to replace these proprietary articles by lines of his own as a measure of self-protection.

We deplore the failure of the Conference Committee to put into operation a plan for regulating the evil, and we think the time is ripe for decisive action on the part of proprietors, which action they owe to the retail trade.

As the meeting of the A. P. A. takes place previous to the meeting of this Association, we shall be gratified to indorse any action recommended by your organization, if in consonance with our views. We trust that the question may be submitted by the A. P. A., in a strong way to the proprietors and jobbers, and await a favorable outcome of your action.

We are respectfully yours,

JOHN E. PECK,
F. J. WURZBURG,
W. A. HALL,
*Committee Trade Interests, Mich. S. P. A.*

SPRINGFIELD, *July* 5, 1892.

MR. W. H. TORBERT, *Chairman Commercial Section, American Pharmaceutical Association:*

*My Dear Sir:* I am directed to place before your Section, the action by the Illinois Pharmaceutical Association, at the Thirteenth Annual Meeting held in Springfield, June 7–8, 1892, in the matter of Trade Interests.

The plan of the Inter-State Retail Druggists League adopted in 1891, viz:

"We hereby agree to withdraw our patronage from any wholesale-dealer or jobber, who knowingly and wilfully furnishes *Cutters* with any *Merchandise* whatsoever. We also agree to discontinue the sale of any patent or proprietary article furnished *Cutters* by Manufacturers or through their agents."

Was unanimously re-adopted, and for the purpose of more thorough organization, the following resolution was adopted,—"That a Committee of Three be appointed in Chicago as a central committee, to conduct the work of securing the signatures of the Retail Druggists of the State of Illinois, to the Inter-State Retail Druggists' Plan, and that they appoint one or more members in each county as an advisory committee, to co-operate, and report from time to time the success achieved."

The American Pharmaceutical Association Plan, with the substitution clause stricken out, was also adopted.

Transmitted by order of the President.

Fraternally Yours,

FRANK FLEURY, *Secretary.*
*Illinois Pharm. Ass'n.*

ST. LOUIS, MO., *July* 6, 1892.

W. H. TORBERT, ESQ., *Chairman Commercial Section, American Pharmaceutical Association:*

*My Dear Sir:* The "plan" evolved by the A. P. A., at its New Orleans meeting was adopted by the Wholesalers and Proprietors, in Convention at Louisville, without a dissenting voice. This "plan" was placed in the hands of a Committee to arrange details, and put it in force.

The details were arranged, after patience had been sorely tried, and then another long and tedious wait, when the Chairman of the Committee on Proprietary Goods announces that owing to an adverse legal opinion there is "no present prospect for further progress."

Nearly nine months have elapsed since this Committee was appointed, and nearly six months have passed since they met and arranged to have this plan put in force. Why all this delay? I am indeed very loth to believe that the adverse legal opinion is alone responsible for the non-adoption of the plan. The rebate plan, which of course leaves the retailer entirely out, has not been abandoned because of being in contravention to anti-trust laws.

Now all that is required is a little backbone on the part of the Committee, and I insist that they should be requested by the American Pharmaceutical Association to put the "plan" in force, irrespective of the contrary and conflicting opinions of the attorneys.

The proprietors are certainly not going to hide behind an adverse legal opinion under existing circumstances, if they are at all in earnest in this movement. If they only play hide and seek with us, the sooner we know it the better for all concerned.

The "plan" may not be perfection, but it is good enough for a starter for all who are at all in earnest in this movement to eliminate the Cutter. Hoping you may have a pleasant meeting, and regretting my inability to be with you, I beg to remain

Yours very truly,

THOS. LAYTON, *Prest.*

*Interstate Retail Druggists' League.*

THE CHAIRMAN: It is proper to state that other state associations, among which are those of Maine and Indiana, have taken similar action, thus making a large number of organizations that have petitioned this body to recommend the proprietors to put the A. P. A. plan into effect.

The Chairman then called for the report of the committee which went to Louisville to meet the proprietors and wholesalers, of which Mr. Alexander has been chairman.

MR. ALEXANDER: The chairman has so thoroughly covered the ground in his able address, that there is very little left for me to say. I have prepared a short statement, which is as follows:

The Proprietors' and Manufacturers' Association having notified the Am. Pharm. Assn, that they would adopt any feasible plan it would formulate for the prevention of cut rates in the prices of Patent Medicines, the Association at its meeting held in the city of New Orleans in April, 1891, formulated and adopted what is known as the A. P. A. plan, which was published in full in the proceedings of the Convention of that year.

A Committee was appointed to visit the Convention of the National Wholesale Druggists' Association held in Louisville, October, 1891, which Convention embraced the Association known as the Proprietors and Manufacturers.

Your Committee would respectfully report, that it visited the Louisville Convention and presented the A. P. A. plan to the National Wholesale Druggists' Association and to the Association of Manufacturers and Proprietors; the plan was thoroughly discussed and after some slight modification was adopted by both Associations. A Committee was appointed consisting of members from the American Pharmaceutical Association, the Proprietors and Manufacturers and the National Wholesale Druggists' Associations, to work out the details and take steps to put the plan in operation.

Respectfully, M. W. ALEXANDER, *Chairman.*

The report was, on motion of Mr. Hallberg, received.

The Chairman extended a cordial welcome to the representatives of the National Wholesale Druggists' Association and invited them to the privileges of the floor.

The Chair stated discussions to be now in order on the subjects brought to the attention of the Section.

It was moved and seconded that debate be limited to five minutes for each speaker. A motion to lay this resolution on the table was carried.

MR. ALPERS: As a delegate from the New Jersey Pharmaceutical Association, I would like to make a few remarks about the all-important subject mentioned in the Chairman's address. Our Association is by no means in a pleasant position here, because the stand it has taken in relation to this question differs materially from that of most of the other state associations. I would rather not say anything, yet I believe the importance of the subject, and the great amount of time you have devoted to it in your deliberations, justify my asking you to hear the other side of the question.

In New Jersey many of us have to compete with the large New York drug firms and dry goods houses, and the conditions are far different from those existing in some of the western towns and cities. We talked about this subject last year and this year, and on both occasions we came to the same conclusion, namely, to drop it, because we do not believe that any good can come from it. It may be that we are wrong, and, if so, we shall be glad to know the reason why, because we like to hear different opinions. We differ, because after careful consideration of the subject, we came to the conclusion that this evil cannot be stopped any more, and that it is a useless waste of time and energy to devote so many valuable hours to discussing the subject. You may ask me why I think so, and I will give you a few of my reasons. One of them is this: We do not believe that the selling of patent medicines is in accordance with the dignity of professional men. Patent medicines are sold in New York in many dry goods stores, and are handled by the most inexperienced persons, by girls of fifteen or sixteen years of age, and not even the ordinary knowledge of measuring or weighing is necessary to enable them to handle those goods. Anybody can do it; neither experience, professional training nor scientific education is necessary to handle patent medicines. The time may perhaps come in the near future when the cigar dealers will reduce the retail price of cigars to three cents. Suppose some of us would then say: "Gentlemen, you must find some means of conferring with the manufacturers of cigars so as to restore the old price of five cents." You will probably say, "We have nothing to do with that as pharmacists," and yet is there any difference between handling cigars or a sarsaparilla nostrum? You don't know what one is made of any more than the other. You might be able to judge a cigar by smoking it yourself, but you are not a judge of a nostrum because you wouldn't take it yourself.

Another point is this: if a man pays for his goods honestly he can sell at whatever price he chooses. Efforts made towards preventing men from getting certain goods will never succeed. At the time when a manufacturer made his efforts to restore the price of his goods to one dollar, everybody round New York was selling, and had been for some time, at seventy-five cents, or perhaps lower. I think it was for two weeks only that the attempt was made to raise the price, but it failed, because the druggists themselves did not want it. They didn't care much, and did not think it was to their interest to restore the price. They thought it paid them better to sell at sixty or eighty cents than at one dollar, and I believe it did. You cannot prevent the goods from getting into the hands of cutters, for they get them through the medium of the retail trade. Some efforts have been made by a medical company, but have they been successful? I do not think that they have. I can sell you all their goods you want for seventy-five cents, and make a good profit on that price.

Now, these are two strong points. Another one is this: The majority of druggists in New York and vicinity (and I can only speak for those of New Jersey, whose relations with New York druggists are almost identical), do not wish to have the prices main-

tained. They endeavored to pass resolutions, but were prevented; they would keep on doing what they have done before, and it is much the same, I believe, with other Associations.

Such actions do not help matters. By resolutions nothing can be gained. It reminds me of the meeting of ministers, who consulted how to reduce sin in the world, and finally one man jumped up and said, "I have it; I move that we abolish the Devil." Now, Mr. Chairman, the Devil cannot be abolished by resolution, and the devil of cutting won't be abolished by resolution either. He is there, and he is there to stay. I say the druggists do not wish to have the prices maintained, or rather they wish it only in a general way, for we would all much rather get a dollar for a certain article than seventy-five cents. Personally I am not a cutter, and I do not plead for cutters at all. I cut, as I am compelled to, in a mild way. I sell a certain dollar preparation at eighty-five cents where I can get it, and where I can not, I am satisfied with seventy-five. So do not misunderstand my position, and think I am a representative of the cutting fraternity. As a matter of principle, we all wish to get the full price, but we will never get it again. All these efforts we may make are exceedingly unpopular. As soon as such deliberations are made known to the public at large, you give the cutter the most powerful lever to forward his own interests. When in New York City some years ago, an association was formed to restore full prices, the cutters had big signs printed, somewhat to this effect, "We are not in the ring;" and every man and woman in New York who bought patent medicines went to these stores, and looked for those signs. The druggists of New York never did more to help cutters than they did then.

There was a time when a medical company had large pictures representing a number of drug men crawling on top of each other, every one offering some sarsaparilla of his own to the customer, who, of course, preferred one make. It caused quite a sensation among the druggists, and a cutter secured one of these pictures, put it up in his store, and painted over it the sentence, "This is the advertisement you pay for by buying another's sarsaparilla. Buy ours, and you need not pay for advertisements. It is better." That man never sold more of his own goods than he did in consequence of that advertisement. Now all of us, I believe, without exception, have commenced to put up our own goods. We have learned to use our own inventive genius to overcome this troublesome matter, and the question is, doesn't it pay us? Since I was compelled to cut, in a mild form, and put up my own preparations, in opposition to those advertised, my net profits have not decreased but increased. And if any one of you will go to the trouble of keeping a strict account of his business dealings in the same way—not for one month or one year, but for five or six years—and compare, you will be surprised to learn that the cutting evil has not done any harm, but has rather increased your net earnings. It has been my experience, and I believe that of everybody who has tried it. We must try to fight this evil and do it in our own way; each one must know his leverage and know what he can do. I have always believed in advertising, and I advertise very largely in my little place, in an original way. I invent schemes, and if I had expected to speak on this occasion, I would have brought some of these advertisements, which differ from those generally used. I believe if the average retail druggist would follow the same course, and exert his energies in this direction, he would be well pleased, and not care to discuss this subject any more. Not because he would rather get 75 cents than a dollar, but simply because he must acknowledge that this is an evil which we cannot overcome by deliberation and resolution. I believe that this is the right position to take, but I do not say that there is no possibility of error. If I have been mistaken, I shall be glad to learn in what way. If this plan of the American Pharmaceutical Association is put in operation, I shall seek to do as well as I can in contributing my share toward making it a success. If you think you can put it into practical effect, do so; I don't think it can be done. I believe it will be better for us to devote our time to scientific research and such things as are strictly professional, than to

spend a whole day in discussing how we shall manage to get ten cents more on an article in which we have no interest, either scientific or professional.

The evil of cutting is no longer a little silver spring that can be overcome by a barrel of sand; it has become a large and powerful stream which you cannot dam up, and it is there to stay. It is much better to acknowledge this and use up the power of the stream by putting your own mills at work by it successfully, than to try to dam it and ignominiously fail.

MR. ALEXANDER: I am glad to know that the gentleman tempered his remarks with the statement that he is not a cutter. From the statements that he has made here we might otherwise have concluded that he is the agent of some grand cutting house, sent here to represent the interests of the fraternity. Another point he has mentioned calls for notice. He says that in his section of the country, New Jersey, the local association passes resolutions and then the members do as they please. I wish to state to him that there are sections of the country where associations pass resolutions whose members are men who are willing to stand by every resolution that is passed.

Another point he has raised is this: he says that we are here wasting our time in talking about cut-rate problems. Does the gentleman know that this is the Commercial Section of the American Pharmaceutical Association? This is not a Scientific Section at all, and we are here just for the purpose of talking about the commercial interests of the pharmacists. He seems to ignore that fact altogether, and to take it for granted that we have made a failure. The American Pharmaceutical Association is no failure. We stand here to-day ready to put into operation a plan formulated by the Commercial Section of the American Pharmaceutical Association. If there is any failure in this plan at all, it rests solely upon the manufacturers, the men who refused to put it into operation. I want it thoroughly understood that this Association has acted in good faith, and that its members are not the ones to back down from their position, nor can the failure be attributed to them. We want all the State and local organizations to know this, so that they will not point to the great American Pharmaceutical Association and say, "There is no use in doing this. Why, the American Pharmaceutical Association—the parent of our Societies—have had this very thing before them, and they have failed. What is the use of our trying it?" The gentleman has expressed this sentiment exactly, "It is no use trying it, we are going to meet with failure," And gentlemen, the way to be a failure is to start out to be a failure; the way to be a success is to start out to be a success.

MR. DADD: The gentleman from New Jersey has made some statements which, in a measure, are perhaps true. The American Pharmaceutical Association probably represents the better element of the pharmacists of the country. Now, the matter lies a great deal in the hands of the pharmacists themselves. If the pharmacist will be a man of his word, and will do what he agrees to do, the question will be settled; but does he always do it? We find men who have lived a long time, and for many years have been in the pharmaceutical business, who will sign compacts that are never kept. I know that for a truth. I have met with such obstacles, and, I believe, as the gentleman says, that it is sometimes a waste of time in arguing with such people. The only success that we can attain is by elevating the standard of morality among pharmacists, so that when a man signs a compact he will keep it. There are men who break their compacts, who are, in the vulgar sense, always "on the make," both in the wholesale and retail branches of the drug trade, and they are the very ones who have betrayed their fellowmen.

The Chairman stated that technically there was nothing before the Section for action, but that it seemed best to permit the discussion to continue in a general way, unless objection should be made.

Mr. Ebert read a communication from the Chicago Retail Druggists' Association, accrediting Messrs. Ebert, Behrens and Dyche as a Committee to represent that Association in the Section on Commercial Interests.

MR. ALPERS: May I have the privilege of making a few remarks? The gentleman from Missouri, from what he said, seems to have thought that I intimated that druggists and pharmacists generally were men who pass resolutions and do not stick to them. I did not intend to suggest such a thing. What I meant to say was, that resolutions are passed by those in attendance; but that the larger number who do not attend meetings, neither this meeting nor state associations' meetings, do not care for those resolutions, but keep right on, and those who pass the resolutions are compelled by business competition to follow the lead of the others and cut; they are put to the alternative of doing what others will do, or of ruining their business. If anybody doubts this, let him come to New York or vicinity. In the place where I live there are twelve druggists. Until recently I have been the only one belonging to the New Jersey Association, and it is only lately that one other has joined. Thus far I am the only one that belongs to the American Pharmaceutical Association. If I should attempt to follow such resolutions as have occasionally been passed in some state associations to restore old prices, I would be the only one in my place in favor of the proceeding. The other eleven would laugh at me, and take my business away. What good does it do me to come back, inspired with the idea to start out with a new plan, knowing that in two or three months I will be out so much money and not be able to pay the rent for my store? The idea is absurd, and I cannot carry it out. Even if I vote for such a resolution I cannot stick to it. That is the reason why, in my State Association, I have urged them not to pass resolutions unless they can make up their minds to stick to them.

MR. EBERT: The gentleman has well said there are some locations in this country where it seems nearly impossible to stop this cutting on proprietary goods or on certain merchandise that we sell. Has he ever thought, however, that that is not all there is to it? Has he ever thought that these cutters, unless checked, will commence to cut on the prices of quinine and every other article of drugs or merchandise that he handles?

Now, gentlemen, let me say to you this, we have in Chicago more cutters than any other city in the United States, but they do not belong to the pharmaceutical profession. That is the trouble. If the pharmacists stand together there will be no cutting. What do I care if a dry goods store or a hardware store cuts on medicines or other goods? It doesn't affect me, providing my neighbor pharmacist does not cut. No; the people of this country are wise enough to choose, and when they want medicine they do not go to the dry goods store, the hardware store, or to the bazars, but they will go to the drug store, providing the druggists do not cut. In the City of Chicago the druggists have their prices to-day and have always maintained them. But there is a lurking evil to-day in Chicago. For the first time we are threatened with a danger that we have never had before, from stores which are not legitimate drug stores in any sense of the word. We do not want the proprietors of patent nostrums to protect their goods so much as we want the wholesale druggists, of whom we are the patrons, to prevent their goods from getting into these so-called drug stores. There is where the evil lies, and that is why we have come before this Commercial Section from the City of Chicago, to ask that when you send your delegates to Montreal to the next meeting of the National Wholesale Druggists Association, you will say to the wholesale trade: "Do not send any outfits to such stores, but keep them from getting supplies." One man in Chicago who is known as a cutter, is going round from store to store trying to get a supply, because there is not a wholesale druggist in the city that will sell him a dollar's worth He has been from one end of the country to the other trying to get his supplies, and it was only by misrepresentation, so I understand, that he was finally able to get any.

Now, gentlemen, isn't there something to fight for? The question is not simply whether you will go into the manufacture of patent medicines yourselves and make your stores the depot of proprietary medicines. If you do that, our professional dignity will be gone.

MR. ELIEL: As I take it, Mr. Chairman, the American Pharmaceutical Association's plan is now before us. We fully expressed our opinions regarding this plan at New Orleans. The majority of state associations have approved of it, among them the Indiana Association. I was very much opposed to the adoption of this plan as it was at first formulated at New Orleans. There were a number of objectionable features in it. Our Association, however, adopted it, and bowing to the wishes of the Association, I trust that this plan will be placed in operation. But, Mr. Chairman, that is not in our power. We have agreed to abide by it, and it lies with the proprietors and jobbers to put it into operation. The various state associations represent a fair working majority of the druggists of this country. They have given their assent to this plan, and I say it rests with the proprietors and with the jobbers to enforce it. Beyond this we cannot go. If they are willing to give the plan a fair trial, we are ready and willing to receive it. We have been waiting for something of this kind, and have been laboring for it very hard, for the last ten years. Now, let us give the proprietors and manufacturers notice that we are willing to receive its benefits.

There are one or two things which strike me in connection with this matter. Should this plan not be put in force, or, when put in force, should it meet with such obstacles as would prevent it from being carried into full effect, we can have recourse to the plan proposed at the meeting of the National Wholesale Druggists' Association in Washington, and which is essentially that favored by the Interstate National League; namely, that we as druggists decline to hold commercial intercourse with those jobbers who will knowingly and wilfully supply cutters with goods of any description whatever; that we decline to handle the pharmaceutical preparations of manufacturing pharmacists who will do the same thing; and that we decline to handle the proprietary articles of such establishments as will sell to cutters. If we carry this out, there is nothing left to the proprietors or to the jobbers but to conform with our wishes. All that is necessary is to stand shoulder to shoulder, and the battle must be won.

Mr. Canning moved that the roll of States be called, and the representatives of state associations speak on this subject. After some discussion as to the advisability of such a motion, it was, on motion, laid on the table.

MR. ROGERS: Although representing New York State, I will not take up much time with my remarks. I would merely express the opinion that we are in the right line now toward carrying out the plan adopted by the A. P. A., and do not believe in taking any backward steps at all. The plan, as originally presented to the proprietors, met with their approval. Some objections were raised on account of certain supposed legal difficulties, suggested by some mild legal light; but this is not entitled to much weight, because it is not a judicial decision. We are entitled to the same protection as is given by the rebate plan to the wholesalers. The retail druggists have approved of the plan, and while it may admit of some misconstruction, we propose to let the plan go right through to the end.

President Finlay here took the chair.

MR. TORBERT: As the representative of the Iowa State Association, I would like to present their view of the matter. Regarding the statements made by the gentleman from New Jersey, I both enjoyed the spirit with which he approached the question, and recog-

nizd the validity and strength of many things he said. In the temper with which he has presented his views, he has set, in my opinion, an example for the spirit and temper of this meeting. Though he differs with me, I have no doubt that this Association will reach a wise conclusion in this matter. Men discussing a question of such magnitude and reaching so many interests in such a spirit, cannot be mistaken in the result they reach. In answering his arguments and differing as I do from the position he takes, I have this to say: he states that in discussing this matter we lose sight of the scientific interests, and he exalts pharmacy as a very god, and the next moment he says that to conduct that exalted profession he adopts the method of the cutter. In the City of Chicago to which Mr. Ebert has referred, they have cutters, and their cutting does not stop at proprietary articles: the day I was in Chicago I cut from the Chicago Tribune an advertisement referring to a certain drug store there from which I will read two or three prices: "Quinine pills (2 grains) per dozen, 5 cents; 3 grain quinine pills, 8 cents." How much is pharmacy worth, exalted to its highest point, with that kind of business going on?

I recognize as keenly as any of you gentlemen from whom I differ, the infinite difficulties that have surrounded the way. I recognize that we are acting and legislating here to-day for thirty thousand pharmacists, in many different sections and under many different conditions. You are confronted with these propositions, and let me briefly review the situation.

In the first place, the proprietors asked for it, and when we formulated the plan, they with certain modifications approved it. We are not expected to furnish a single detail for the final execution and operation of the plan. We are simply here to recommend. Look, gentlemen, to what you are objecting. You are objecting that the Commercial Section of the American Pharmaceutical Association shall recommend the proprietors to protect the retail pharmacists of the country. That is your proposition. Now I submit to you that in view of the action of the American Pharmaceutical Association already taken, in view of the fact that this question has been before us for two years, in view of the fact that we adopted the plan, that it is our plan essentially, and at the request of the proprietors, that you cannot afford to-day to stultify the action of the American Pharmaceutical Association by saying that it is a failure and abortive, and we must give it up. And again, if that should be the conclusion of this gathering, this issue will result in raising a precedent which will forever make it impossible for any association of pharmacists in any locality to do anything to protect the retailers in the matter of selling proprietary articles at full prices. It will forever be thrown in your face that the plan of the American Pharmaceutical Association, which you formulated, and of which the proprietors and wholesalers approved, was by you decided a failure, and that you left the cutter supreme master of the field. Now, gentlemen, I hope you will take no such action as that. It means too much. Let the plan be what you say it is, if the description of my friend from New Jersey is absolutely true, if it shall prove, as he said, in the final and ultimate analysis, to be a failure, I beseech you to let the responsibility of that failure be upon the Proprietors' Association, who asked us to formulate the plan, and let us not by our action anticipate the result and say, "You need not put it in operation, because we have already discovered that it will be a failure."

Mr. Torbert then resumed the chair.

MR. WATSON: On behalf of the Florida State Association, I may say that it unanimously adopted the A. P. A. plan We have but little cutting in our State now, and only in a general way.

MR. CHURCH: The Virginia Pharmaceutical Association is, and always has been, strongly opposed to cutting, and I believe there is very little cutting in our State at the present time. I would also say that the drug business in our State is in a very healthy condition considering the healthy condition of our inhabitants.

Mr. Kline arose to a question of personal privilege.

MR. KLINE: It is certainly clear to a few of the members present, if not to a large number, that a reflection has been cast upon the Chairman of the Tripartite Committee, and through him upon the Committee itself, in regard to a circumstance which I regret, not for my own sake, for I think I can take care of myself, not on account of the concern I represent, for I think I can take care of that, but in behalf of the Committee with which I was connected and am connected, and in behalf of the work which that Committee has undertaken, and in behalf of the general objects and actions relating to protection of retail druggists, with which I have been actively identified since 1883. It is, therefore, proper, that I should say to this body what I have to say, and not reply to such letters as have reached me. The matter, as I understand it, has been reported in a pharmaceutical journal published in St. Louis, and is, therefore, public property. It has been charged that the firm with which I am connected have in operation, in the State of Pennsylvania, a practical cutting scheme, and a house to house peddling scheme, upon their own goods, and that a concern which does that sort of thing has connected with it, for its general manager, a gentleman who is Secretary of a Committee, which Committee (if I read aright between the lines) has been fooling us for over a year. Now, gentlemen, if that is true, I desire exactly what has been stated to me in a letter written on the stationery of the St. Louis Apothecary's Association, namely, to be kicked out, and I stand here ready for that operation. If it is not true, then I think it is due to the Association, and to this Committee, and to myself, that an opportunity be afforded to put myself properly on record regarding this circumstance. I think it would have been only common courtesy for the journal referred to, to have asked for the other side of the question, but that appears not to be the way in which they do such things in certain parts of St. Louis.

My remarks, however, are not so much intended to criticise any journal or the writer of any letter as to reply to what has been whispered about. In other words, I do not propose that you shall think there is anything in connection with the business with which I am associated, that, because I am a member of this Committee, needs to be buried. I claim that it is a matter which should be brought to light; and I appeal to you, Mr. Chairman, whether it was not, from the moment that I came here, my wish that I should do this, and not allow a misconception to exist where it could be swept away?

The circumstance is exactly this. Twenty years ago we purchased the proprietary right for two liniments, both of which, at the time we purchased them, had been introduced and advertised in the manner described in a clipping from a paper published in the City of Erie, and which gave rise to this report. The proprietor of one of them, so far as I am rightly informed, invented the plan. It has since been followed by many imitators, and is in successful operation to-day by hundreds of others. When we made the purchase, fifteen men were usually employed by the respective proprietors. For ten years subsequent to the purchase, the plan was under the immediate charge of the original owner, although, of course, the firm with which I am connected controlled it. At the end of that time the management was taken out of his hands and is now in our own. We reduced the number of men employed from fifteen to a few of the older hands, who had been engaged by the former proprietor for many years. Their method is to leave on trial in a few places (this is only known in Pennsylvania, and I think my friends from that state are thoroughly conversant with it) bottles of these liniments, with the privilege of using one-third. In two months the canvasser comes back and gets either the medicine or the money, the price being half a dollar. Under no consideration, as our instructions go, will less be accepted. Six years ago, when the cutting evil became very bad in some of the larger cities, they appealed to me to be permitted to accept a compromise, but I never gave them the privilege. The object of the whole work is pre-

cisely the same as that of placing four or five or six-inch advertisements in daily papers, namely, to create a demand, not to peddle medicine from house to house. However, we have recently given them the privilege of accepting one dollar for three bottles in cities where the universal price is 35 cents. In no place that they have ever visited, so far as my knowledge goes, have any of the druggists objected to it; in no place, so far as I am informed, has it ever been done contrary to their objections; and in nearly all places it is not only done with the full knowledge but the co-operation of some of the leading druggists of the place. That is the whole story. The druggist reaps the benefit of the advertising, just the same as he would if we distributed samples. This circumstance was unfortunately placed in an entirely different light by some one who reported having, as he thought, proper cause (and I will not go into his reasons because it would not be creditable to him), and it has been spread, as I understand, all over the country for the purpose of injuring, not as I think the concern with which I am connected nor as against myself personally, but to injure the cause with which I have been identified through all these years. These are some of the difficulties that the Committee has had to cope with, and I wished, in making this statement, to extricate them from an unpleasant position, even though I might not succeed in extricating myself.

MR. MAJOR: I have a plan here, in writing, Mr. Chairman, that I would like to present. Briefly stated, it is arranged on this basis: We have rights as citizens of this country. We have laws on our statute books regarding copyright. They were enacted so that if a man had a patented article of any kind he might be protected, and make it a success. You know that if the composition of a patented article is known, it is liable to be the ruin of it. I think we should depend on personal rights. We ought to claim that we have the right to establish the price upon all goods, and that no man should have the right to sell those goods at less than the price named by the manufacturer or owner, unless he has a permit to do so. In this way the blame could be placed at the proper place.

Mr. Alexander offered the following resolution:

*Resolved*, That the plan of the A. P. A., as ratified by the Joint Committee of the National Wholesale Druggists' Association, the Association of Manufacturers and Dealers in Proprietary Medicines and the American Pharmaceutical Association, be reaffirmed, and that this Section requests the manufacturers of and dealers in proprietary medicines to put the plan in operation at the earliest possible moment.

The resolution was duly seconded.

MR. MARTIN: I would like to make a few remarks, and then follow them up with a resolution which I wish to offer about this cutting matter. I take a somewhat different view from that of my friend from New Jersey. The devil has come here to stay, as he calls it, and I think the whole patent medicine trouble is due to the devil in the drug business. I think the proper course to take, if unable to get rid of him, is to regulate him, and the only way for us to do is to regulate a necessary evil. If we are unanimous in our action and reaffirm this A. P. A. plan, we can tell the manufacturers, "If we cannot legally combine to throw your goods out of our stores, we can, at least, individually throw them out by our own action of recommending something else," and the sooner we do it the better.

Mr. Martin then related his experience in the store of a Chicago cutter, who was asked for a certain proprietary article which the manufacturer endeavored to keep out of cutters' stores; he did not have it, said it was no good, and he kept only first-class patent medicines.

MR. MARTIN: I know that the goods manufactured under that name are all numbered. If every patent medicine concern would number their medicine packages as they manufacture, in rotation, and keep an account of each lot as it goes out, there would not be very much trouble in tracing who it is that supplies these cutters. For this reason, I present the following resolution:

*Resolved,* That all proprietors and manufacturers of medicinal preparations be urgently requested, at the earliest practicable period, to devise such simple methods of marking the packages of their articles intended for retail use as will facilitate identification of the source of supply of such goods.

In conclusion, I would refer to the great error we Chicago people have made in years gone by in relation to the cutting evil. We were united in all matters of that kind, and should have let the matter rest there. But when we went to the different meetings we paraded it before the public at large, that we had no cutting, and the next thing we knew the cutter was at our doors.

MR. HALLBERG: I was very much impressed by the position taken by Mr. Alpers, who I understand is of the correct, straight-laced opinion. His argument as to why this matter of selling patent medicines is simply on a par with any other kind of merchandise, no one can refute. That the patent medicine sales even have had a derogatory effect on the business of pharmacy, nobody can deny. But Mr. Alpers living and always having lived on the Atlantic Coast, thinks that the whole United States is situated in the vicinity of Manhattan Island. It is safe to say that while neither this plan nor any other could have any effect in stemming the immense river that this little silver spring has grown into in the cities of New York, Boston, Philadelphia and Washington, yet when it stretches its tentacles across the continent and reaches a country that comprises fully 90 per cent. of the retail druggists of the United States, where there is not even the silver spring of cutting, then is the time we want to take time by the forelock, and erect the levees and the jetties to protect the 90 per cent., while they are strong, have got the ammunition, and are able to erect a bulwark to stem the tide. If you wait until the cutting has commenced to encroach upon this territory, you will be in identically the same position as the druggists in the city of Bayonne. It will be an impossibility. But you must remember that the 90 per cent. ask this 10 per cent. to go out of the way, if necessary, to help them, to formulate the only tangible proposition that has been submitted thus far for the purpose of remedying the evil. I believe that the American Pharmaceutical Association plan as it stands at the present time, if properly worked, will do something, but it will amount to nothing except by local organization. You must have local organization in every hamlet, and keep the members together; but local organization without something national in its character, that we can all look up to, would not be effective. For that reason, while I approve the sentiments of Mr. Alpers, I am in favor of these methods as temporary expedients, in order to let the druggists of the country eventually and gradually work their way out of the business of simply selling medicines, for the purpose of becoming pharmacists in fact, and practicing their profession.

MR. CANNING: I have been waiting patiently to state my position as Chairman of that celebrated Tripartite Committee, preferring to hear from every one present before I had my say. I wish I had the rhetorical powers of the chair at this particular time, because then I might succeed in convincing this body that what I may say to them in the next five or ten minutes has a great deal of truth. The chair very flatteringly alluded to the Chairman of the Tripartite Committee. I can take exception to some things he said, but he, at least, gave me credit for honesty. Some of my remarks may surprise this body at this particular time before I get through, but they will be honest remarks, and based upon an experience in connection with plan committees ever since they were first thought of, since 1883, when the National Wholesale Druggists' Associatio nevolved the Campion plan, which was shortly afterwards launched upon the trade.

This Tripartite Committee, to begin with, has been somewhat quiet for a number of months past. We have been, in some quarters, severely criticised for that inaction; but when you come to consider that either way you put it, whether we should announce success or failure, we were simply furnishing tools for the enemy; I must consider myself largely responsible for keeping the Committee quiet, because I think we gain nothing by giving ourselves away to the enemy, but simply furnish tools. This is why the Committee has been quiet. I want to state in all honesty that I myself as a retailer, am more responsible for that inaction than all the rest of the Committee put together. I think you can see my reasons for it, as I have stated. The American Pharmaceutical Association plan was inaugurated, as you know, a year ago at New Orleans. With a great spread-eagle flourish, it was brought before us, the proprietors expressing their willingness to adopt whatever we might bring forward. They were honest in that expression, I believe, and a large number of them are honest in similar expressions to this day, notwithstanding our failure to accomplish anything. It must be remembered that this Tripartite Committee is not responsible for failure; we have done all that we could do. We met in New York, formulated a plan, and when we got twenty proprietors to adopt it, it was to be submitted to the retail trade of the country, and then put into operation after it was found to be legal.

Notwithstanding all the remarks about the legality of this plan, some of the journals have stated that it is an open question, and perhaps it is. You can buy any kind of an opinion from a lawyer. But we have had several opinions on this plan, and the consensus of opinion, thus far, has been against it. They are able opinions. This Association never put me on a Committee to recommend the adoption of any plan to a proprietor or body of proprietors that had a taint of illegality, and I never would do so. In view of this you must certainly all admit that there is a taint. One by one the proprietors withdrew until they could be convinced the other way. Anyone of us would have done the same. In the meantime, while they had nothing to do with the work of this Committee, several individual plans were in operation: the first plan, the Ayer plan, the Haseltine plan, the Seabury & Johnson plan, practically all the American Pharmaceutical Association plans—more particularly the first plan, perhaps. It has been stated that we might go ahead with less than twenty proprietors. For instance, there were three proprietors, as you have been informed by the printed report, who said they were willing to go on, law or no law, for a trial, and undoubtedly twenty proprietors would be willing to go on, law or no law, or even forty proprietors, if we could get the retail trade of this country to show by any general expression that they wanted it and would support it. When I say that, I do not mean resolutions from the American Pharmaceutical Association. I said I was going to make use of some honest expressions here. This body represents fifteen hundred druggists throughout this country. The men who attend these meetings are exactly the men who would carry out the spirit of our resolutions to the letter, but we in attendance at this meeting cannot say what the other thirteen hundred will do. At the various state associations we have the same conditions. The public spirited men who attend the meetings represent about one sixth of the whole number. They resolve, and impressed with this feeling, are willing to do what can be done, but they have a lodestone to carry in all the rest who do not attend. We cannot deny there is a tremendous apathy in the trade of this country. Now, mark the success of these individual plans.

Why, there is not a cutting centre in this country where you cannot buy all the goods you want, and the man who first signs the contract is signing against himself. If I bind myself to get full price for a preparation, over my signature, and am an honest man, what is the result? I lose the sale of hundreds of preparations because I want a dollar. My neighbor up the street can sell all he has a mind to at sixty-seven cents, because he

can get all the goods he wants to, and if he does sign an agreement he breaks it. What is the use of signing, if we cannot get all the trade to join us?

Now, as to the suggestion made by the chair, that we try this plan for the benefit of the retail trade, don't we admit right straight up and down our weakness? When we say to the proprietors, "Let us put that plan in operation, never mind about getting the vote of the trade, the American Pharmaceutical Association has asked for it, and also the various State Associations throughout the country," notwithstanding the way the trade has received those plans, don't we show weakness right off by asking them to do that without a vote or some expression of the will of the trade of this country? I will admit that to obtain a vote is very expensive, and I want to state right here that the American Pharmaceutical Association, through its Council, during the past year, tendered every dollar that your representatives on this Committee have asked, and they have spent for the retail trade on this matter, during the past year, nearly one thousand dollars. We have the fact staring us in the face that that expenditure has brought about what? Almost nothing, except from an educational point of view. How could we get that expression except by vote? I am in touch with the spirit of Mr. Alexander's resolution to a certain extent. I do not want the American Pharmaceutical Association during the coming year to spend one dollar on the American Pharmaceutical Association plan. This Association has manfully done its duty, but I think we want to stand up and recommend to the trade of this country as the only last resort (the only one, I claim, and this claim is based on a pretty long experience) that we recommend thorough local and general organization. Why, gentlemen, if you have perfect organization of the trade, the trade of Boston in touch with the trade of New York, and New York with Chicago—there need not be a unit, a majority of them is sufficient—it is a foregone conclusion that the manufacturers and proprietors will gladly accord what you ask for. But to resolve, or, in the exact wording of that resolution, to "re-affirm," etc., will amount to nothing. Let us therefore simply recommend the trade of this country to organize, and then they will get whatever they ask for. If the proprietors cannot do it jointly, they will do it singly, and there is no doubt about it.

I don't know that I can say anything further at this time, but I would add that the Tripartite Committee have worked faithfully on this thing, and have gone as far as they could. I cannot keep my feet on this floor, however, without referring to a recent criticism in what I consider one of the leading pharmaceutical journals of this country, in which it was stated that these gentlemen accepted this position, and then refused to do the work. As that particular journal was informed of every move of this Committee from beginning to end, this was certainly an ungenerous thrust. Now, I would not accept from any organization a position on a similar Committee for the rest of the days of my life, on account of the work that I have put into this Committee for the past year. The Secretary can bear me out in saying that I have kept him pretty busy writing letters. That is all I have to say about that journal. Perhaps its representative is present and may defend himself.

I would now offer as an amendment to the resolution presented by Mr. Alexander, the following:

*Resolved*, That it is the sense of this Association that relief from cut-rate evils can only be obtained by general request of the retail trade through local organization.

The resolution was seconded.

MR. KLINE: I think now it cannot be amiss for the Secretary to have a word. I have convictions upon this point, and I think I have some knowledge. I shall refer to both of them, though aware that I may not be on the popular side of this question as it appears now. It is needless to make any defence of the committee itself, but it may be

proper to refer to errors that are made by our friends on the outside, in criticising our action, which I want to treat in the kindliest terms, and in the interests of the general organization. The mistakes, as they occur to me, are these: they have already been adduced by our Chairman of the Tripartite Committee, they were voiced by the Chairman of the Commercial Section in his address, and they are apparent to any one who during all these years has had anything to do with work of this kind.

This body, as Mr. Canning has said, usually represented by an attendance of some two hundred members, passes certain resolutions, appoints certain committees, places upon their shoulders certain responsibilities, and then some say to them during the year and at the end of the year, that because the results have not been consummated, the committee is to blame. Now, the mistake is this, and it is the gist, I believe, of Mr. Canning's remarks, and is the conclusion that any man who has watched the subject must come to. The retail druggists of this country, not by committee only, not by any single association or representation of a large minority of such retail druggists, not through State Associations that represent a minority of them, but in numbers so large as to be overwhelming, perform this work. Will they do it? They have not done it. Professor Hallberg has stated that certain gentlemen who have spoken imagine that the population of this country centres largely around Manhattan Island. Of course, it is well known that lately it has centralized in the World's Columbian City, and we must concede very much to the enterprise as well as the intelligence of that particular section. But there is one lesson which Chicago has still to learn, which St. Louis has to learn, and which they refused to learn in 1883 and 1884, when my friend from Boston and myself put in so many hours, trying to get them interested in a project which had they then given their zealcus support, would to-day be in operation and a success, but they did not do it. I will say for St. Louis that there were a great many comforting words from that city, but from the rest of the country there was no support to speak of—they had no need of it, and they had no particular sympathy with it. Now the evil has reached those sections, and has become so deep-seated that there is only one way to uproot it, and one that has never been adopted. If the gentlemen from the west who are now so zealous in this cause, and properly so (and I place much confidence in what they have accomplished through their zeal) will rise en masse, and over their signatures ask the proprietors to put this plan into operation, I believe that the result is inevitable. I am very sorry that our Chairman differs from me, or that I should be obliged to differ from the Chairman; but it seems to me that it is absolutely useless for any committee representing any body to go to these gentlemen now and say, "You put the plan into operation, and we will do the rest." You must convince them first that you are in active, hearty sympathy with the work that is demanded, that you will carry it out; and that can only be done properly in the manner outlined in the deliberations and findings of our committee on the 20th of January last, namely, by asking the proprietors over your signatures, then and there, not only to approve the plan, but to actually agree, after the plan is adopted, to adhere to its conditions.

The very identical thing that was almost virtually involved in the plan, which was to be submitted to a vote, has been submitted to almost every retail druggist in the United States, and has received the signatures of a large majority of the retail druggists of the country; and yet it is a fact that in the States already referred to it seems to amount to nothing. Now, if the conjecture of the committee is correct, that the plan, adopted by twenty thousand, would be more effectual, then it might be well to get such a paper signed by a large number of the retail druggists of the United States. The criticism is being constantly made that the proprietors in this matter are not in earnest, and that the proprietors are simply fooling. I believe I am safe in saying on this floor, as an absolute fact, that there is not a proprietor of any consequence in this country who studies his own interests who does not feel as deep an interest in the outcome of this matter as any

retailer can; and although their motives may be selfish (precisely the same as with the retail druggists who ask for it), they do understand their self-interest sufficiently to feel that a great share of this undertaking should be accomplished. That it is not accomplished, is not altogether owing to lack of interest. Then what is it owing to? It is owing to a conviction that under the present conditions it cannot be done. That is the plain fact. Can anything be done to-day, or go out from this meeting, that shall change these conditions? If there can, these conditions are not insurmountable; but I think that the resolution offered by Mr. Alexander should be amended to the effect that it be brought to the attention of the proprietors over the signatures of twenty thousand retail druggists of this country and a committee from this body. That need not be a tripartite committee, but only one from this body or one man from this body; but let him come with twenty thousand signatures over that resolution, and see what the effect will be.

MR. PARSONS: I am not a member of the American Pharmaceutical Association; I am the editor of the Pharmaceutical Era of Detroit. Chairman Canning, of the Conference Committee, made some reference to a pharmaceutical journal, and some of its utterances, and said that perhaps the representative of that paper would make himself known. I think he referred to what the Pharmaceutical Era has said. I would like to say right here that the Pharmaceutical Era has tried to be just, and believes it has been consistent throughout the whole discussion of this patent medicine question. Any criticisms we have seen fit to offer have been the outcome of careful thought and study, after thorough consideration of the whole matter. We have been in a position to feel very closely the touch of the entire drug trade of the United States. We have criticised the Conference Committee recently. We have asked why something has not been done. We have asked that, because we have been asked by a very great number of druggists throughout the country, what is going to be done, and we in turn asked the question, and are not afraid to maintain our position. I am sorry to have been obliged to make this statement in answer to Mr. Canning's remarks. Other than that, we have no further explanation to offer.

MR. CANNING: I would like to ask the gentleman a question or two. He stated that he has said all that he wants to regarding the position of the Era. I take exception to only one statement, which was, that the members of this Committee had accepted their positions, and then had refused to do the work, or words to that effect—that they were mere ornaments. We take this position because it has been intimated between the lines, that we willingly kept from doing this work. I made those remarks in defence of my Committee, although that Committee needs no defence, because such a statement as that going throughout the country may lead some druggists who do not know the members of this Committee to believe they are true. Now, I ask the gentleman whether it is not true that the Era was kept thoroughly informed from the beginning of this movement until its end, through the Secretary, of every step that was taken by the Committee?

MR. PARSONS: The Era has been kept thoroughly informed, through its own solicitation chiefly.

MR. CANNING: Never mind how it has been kept informed—but it has been kept informed?

MR. PARSONS: Yes, sir; upon that basis it has.

MR. CANNING: Every member of the Committee has been appealed to, and every member sent you a reply; I know I have.

MR. PARSONS: Yes, sir; very nearly all.

MR. CANNING: Not only that, but our official representative, the Secretary, has kept you informed of every move. You knew that the Committee, at least, was not idle, did you not?

MR. PARSONS: I rather think they have been, if you ask my opinion.

MR. CANNING: Did you glean that from the replies you received?

MR. PARSONS: Yes, sir.

MR. CANNING: Then, I have nothing more to say. The Association can form its own conclusion.

MR. KLINE: In regard to one of these editorials, I think the Committee needs to be set right. It has been stated that when the final report was made by the Secretary, it was not published until it had stood some sixty or ninety days after being fully agreed upon, and was kept quiet. I would ask whether it is not a fact that the Pharmaceutical Era (and I can say now that it was the only journal in the country that was given a synopsis of what we had done up to that time, and at the editor's solicitation) was not kept in ignorance, and the Committee did not seek to keep it in ignorance. Isn't it a fact that I wrote to the Pharmaceutical Era, and asked why the matter had not been made public, as the Committee was anxious that the trade should be fully informed in regard to it? You may not care to answer the question, perhaps, but I will say that it is a fact that the Secretary gave all the journals the synopsis made up for the Pharmaceutical Era, and for reasons best known to themselves, they did not, at that time, make it known, unless it was the "Oil, Paint and Drug Reporter," and the "Druggists' Circular," and they did so briefly. There was nothing hid, but the Pharmaceutical Era editorial hinted that there was.

MR. PARSONS: What statement have you reference to?

MR. KLINE: The whole status of the affair, up to the time when the legal opinions were obtained, and the seventeen proprietors had, to some extent, withdrawn.

MR. PARSONS: This is not a matter for much defence on either side, but one of honest difference. I would ask if you see fit to insert the dates of those legal opinions?

MR. KLINE: I can't give you the exact dates from memory. On Wednesday, January 20th, we had a meeting at the Fifth Avenue Hotel, all day and all night. On the following Saturday, or as quickly as I could get the thing in shape, Mr. Sharp and I consulted Mr. J. G. Johnson, our attorney. On the same date, we consulted by letter with Mr. Jayne, who was another attorney. When those two opinions were received, as you may remember, they differed. The Secretary, under instructions from the Chairman, kept every one fully advised, and there was no step taken of which each member of the Committee was not informed as to what should next be done. We then went to the individual proprietors who had signified a willingness to adopt the plan, and asked them individually to get, from their own attorneys, opinions, so as to satisfy themselves, and then the delay occurred. Some said they would, others said they would not, but we patiently waited and wrote, and finally gave it up. But all the delay that Mr. Parsons is now referring to occurred at that stage, when we wanted seventeen proprietors to get an opinion of their own, and some consented to do so, and said the attorneys could not give a positive opinion, and finally we gave it up.

MR. SEABURY: I think this matter should be stricken from the minutes. It has nothing to do with our regular business, and we must certainly stand by our own Committee as against any public criticism.

MR. KLINE: I object to that. This statement was made in a public journal, and our replies should be as publicly diffused by this organization, in defence of our Committee.

THE CHAIRMAN: Mr. Canning referred to this matter, and Mr. Parsons comes here, as a question of privilege, and not as a member; it is a courtesy on our part—asking him to make an explanation; and I think that such courtesy and civility as should obtain in a body like this demands that we should grant it to him. I hope, therefore, that Mr. Seabury will withdraw his objection, and that Mr. Parsons shall be allowed to make his statement.

MR. SEABURY: The only point is, whether this discussion should appear in our printed report.

THE CHAIRMAN: I think we shall all want to read it.

MR. KLINE: I hope Mr. Parsons will be allowed to go on. I think it is as much due to the *Pharmaceutical Era* as to the committee that a due explanation be given.

MR. PARSONS: I am afraid that I have said something which leads you to infer that I want to make an explanation. I do not want to make an explanation regarding our position; we stand by all that we have said. I acknowledge myself to be the writer of the article to which Mr. Canning takes exception. I am willing to stand by it; it is my honest conviction and criticism.

Perhaps exception may be taken to the fact that I made it more of a personal matter than an editorial should be, but further than that I have no explanation to make. I have my beliefs on this patent medicine problem. I believe simply this, that the proprietors owe protection to the retail trade, and what the American Pharmaceutical Association wants to ask is, "When are you going to give it to us? As to the details of the plan, let that be left to those who are better qualified to arrange them than we are. We want protection, and mean to clamor for it until we get it, and if you do not give it, we will throw your goods out and put in our own."

By unanimous consent, the further consideration of the pending resolutions was deferred until the afternoon session.

Mr. Ebert moved the appointment of a committee of three to nominate officers of this Section for the ensuing year. The motion was seconded by Mr. Seabury and adopted; and the chair appointed Messrs. Eliel, Alexander and Dadd said committee.

The Association then adjourned until 3 o'clock p. m.

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## SECOND SESSION.—FRIDAY AFTERNOON, JULY 15.

The Section was called to order at 3:30 p. m. by Chairman Torbert. The first business in order being the consideration of the resolution of Mr. Alexander, presented at the first session, it was read by the Secretary, together with Mr. Canning's amendment thereto (see pages 127 and 130).

MR. ALEXANDER: I hope that the amendment will not prevail. I want the resolution to go out just as it was offered, which was done, as I stated this morning, for the purpose of letting the Manufacturers' and Proprietors' Association know that we expect them to put this plan in operation. That resolution should go out separate and distinct. If, afterwards, it is desired to offer that amendment as a separate motion, I would not object

to it at all, but my motion was made for the single purpose of placing the responsibility where it belongs.

MR. CANNING: I am perfectly in sympathy with the spirit underlying that resolution, but it will accomplish nothing. The experience of the past year has been such, and it will be a repetition in the future, if we simply say to these proprietors, "We re-affirm our belief in this plan, notwithstanding the fact that some of the ablest minds in our organization have been working on this problem in vain for the last ten years." We started out with the supposition that no relief could ever be obtained without, in some way, securing an expression of the good will of the trade of this country, and such a resolution will therefore simply fall flat. The proprietors are still determined, as they said a year ago, that when the retail trade of this country say they want the plan they can have it, and there is no doubt but what they can have it whenever they say so. Another reason why this resolution will simply fall flat: What proprietor will pay any attention to such a resolution, when the experience of the past year, in all those individual plans, which amount to the same thing as the A. P. A. plan, shows that they are simply rejected by the trade? No attention will be paid to it, and the cutters can buy all they want. The trade does not back up those men anywhere; but what is the use of coming out with a resolution in which we simply re-affirm our belief in something that cannot be accomplished? The amendment, on the contrary, simply asserts that after trying all these years to do something, we come back to the fundamental principle that nothing can be done without the good will of the trade, and that the only relief in the cut-rate problem is to be gained by an expression of the whole trade, throughout the country, by local organizations; that means something. When you get that you can do something.

MR. SEABURY: I have kept quiet purposely, because I wanted to know if we had anything new to offer on this subject. In rising, I want to support the resolution re-affirming the tripartite plan, because, in my judgment, no plan will ever succeed without the three factors in this revolution cordially shaking hands with each other. I propose to speak on the practical side of the causes of failure, and a man who cannot debate both sides does not understand his subject.

It is needless for me to make the statement that I am one of the old veterans from the Campion plan down, and have never violated my agreement. Now, I will speak first of the manufacturers on whom you chiefly rely, and who, according to my judgment, form only one part of this protective system. It is true that we have some manufacturers who are true blue, and honest; we have also other manufacturers who try to carry water on both shoulders. That is a discovery we made ten years ago, and it has been perpetuated. They not only are willing to supply goods to the assassins of the drug trade in the dry goods trade, the department stores, but also to the cutters or anybody who wants the goods, and has money to pay for them; and they simply use the protective plan as a man would use an umbrella in a rain storm. When we can eliminate such men from the ranks of the manufacturers, I don't think that we will have quite so much substitution among the wholesalers and retailers. We all know that we are living in an age of substitution, especially in those centres that range along the Atlantic coast, from Boston to Washington. I don't think it has gone much farther than that. They did have it in New Orleans, but thanks to the President of this Association, who showed them the value of unity, they are, to-day, as a band of brothers. Now, the men who should be eliminated from any protective plan are those who are willing to serve God and the devil with both hands, and I think it would be well, when a protective plan is instituted, that every man should be disciplined and made to understand what his duty is primarily.

So much for the manufacturer. The second and most dangerous factor in our tri-

partite agreement is the wholesaler, because from the Campion plan to the present plan, if adopted, we would always find the jobber or the wholesaler working adversely. I don't say all of them, for there are some good and true men among them, but what do they amount to? Suppose you get 25 per cent. of wholesalers that are honest. The rest simply spread ruin everywhere; if it is not in one city it is in another. Even at the present time, in New York City, I think that there are one or two jobbers that are perfectly willing to supply anybody, plan or no plan, and the way to deal with those gentlemen is according to the A. P. A. plan every time. I think that when such men are discovered and proof is positive, there is only one thing for the retailer and manufacturer to do, and I need not tell you what that is. They are practically doing the same thing as retail druggists are, in large cutting cities. They "never substitute," but the fact remains that they do, positively, and I consider that it is morally criminal, to substitute goods for another, on the assertion that the article which he offers for the genuine is "just as good or better," etc. What does he know about it? I am not going to pour acetic acid into the wounds, and make matters worse. I am going to stand by the ship even if she sinks, and so long as there is an Association in this country that will defend itself. I don't believe in the cry of the cutter when he says that this situation cannot be changed. I say that it can, and it is possible by the introduction of honor and a little of the elixir of manhood, though it may take time. We have many manly retailers throughout this country. It is said that union cannot be effected in some localities. This morning a gentleman from Bayonne said that there were twelve druggists in that city, and he, with the rest, is cutting, because the whole city of New York and environs cuts, which is practically the truth. Now, hundreds of our members would quietly go to these neighbors, and say, "Gentlemen, let us get together and act like men. There is no use in our cutting at all. Let us get together and work reasonably, and if anybody wants to buy medicines of the hardware dealer or anybody else in New York, let them send for the goods, but let us stand firm." My judgment is (and it has been sustained throughout the country) that they will get full prices every time. It is only the weak-kneed brother that yields, and the only way to do with him is to give him a dose of the hercic treatment that we have had all over the country, and see how quickly he will haul down his flag and join you. I think that time has come, and there is a possible chance throughout the Union of settling this question, and this question can only be settled by aggressiveness on the part of the retailer and nobody else. It is the foundation of victory, and victory rests nowhere else. Then why be timid? It is nothing but this apathy and indifference among us that perpetuates this evil, and the sooner that this work is accomplished with its attendant result of exalting pharmacy to the position that it richly deserves, because of its responsibility before the law, the sooner we will have a very different class of medicines and preparations throughout the country. Why, sir, I can see with my dim vision the debasement that has taken place throughout the whole Union in all these cutting stores. They are not pharmacies, they look more like bazars, and I say of my own knowledge and experience there is not a cutter in all the country but wants the cheapest goods you can furnish him. He does not want goods up to pharmacopœial standard, but says, "Give us the label, that is all we want, and we will sell at cut-rate prices." Now, what has this worked itself into, this buying of indifferent goods? It has led to self-prescribing by the physician, a point to which I called your attention not more than four or five months ago in a published article, every line of which was true. And it is being done more to-day than ever. Are you going to stand by your colors? If you do, you will unite, just as soon as you know how, and fight not only the manufacturer but the jobber, and the field is yours every time. The eastern cities have not had the manhood to do it, and every one of them apes the customs of the cutter. They don't want to buy good goods any more, they want cheap goods in every direction. What are you going to do in these different states if you allow every physician in the community to buy

his own outfit? The result of that has been the passage of the law in Pennsylvania allowing a physician to be a pharmacist, and I tell you it is going to spread throughout the country; and that very movement, with all respect to the American Medical Association, was fathered by that organization. Now, I say, we must cry "halt, stop," until we can put an end to this evil, and the only way is to stand up among ourselves and for ourselves, and we will at least make a better living. It is not often that I can be led to thow a little humor into a very serious debate, but I will simply say that if this is not stopped within the next year, about 75 per cent. of all the druggists that are on the Atlantic coast and in the cutting cities will have to live on fried snowballs. Mr. Chairman, look at the deplorable condition in some of our cities. I am ashamed to make the statement that from 60 to 75 per cent. of the retailers are owned by jobbing houses. They cannot pay their bills at maturity, and they are carried from month to month, that is the truth. They are not independent, and if they order a certain class of goods, I don't care whose, they are obliged to take what they receive, or perhaps the account may be balanced.

We must consider, too, that after all, 85 or 90 per cent. of our brethren are not afflicted with this evil. Therefore, I would plead with that 85 or 90 per cent. to stand by this resolution of the American Pharmaceutical Association, and let them hold up the other 15 or 20 per cent. of our brethren who are oppressed. It is our duty to do it, and not be indifferent to it. There is no use in wrangling over this question. I will admit that as long as you listen to scalpers and cutters, and as long as manufacturers or jobbers will supply cutters in the dry goods trade, what protection have we? We only have a moral protection, and the only way to exercise that is according to the spirit of these resolutions.

Mr. Martin, I think, said something about numbering goods. I will show him how easily he can be deceived. We will take, for instance, the city of Chicago, where you have six or eight wholesale druggists. Suppose I was the manufacturer of a sarsaparilla, and the bottles were all marked. If these men want to be dishonest, they are going to throw my whole business into absolute confusion. A will buy No. 1, B No. 2, C No. 3, and so on. Well, A is supplying a cutter, we will say, and he is a good customer; he sells him lots of goods, because he slaughters them, and withdraws all the trade from its legitimate channels from all over the city. A is quite cool, uses his index-finger, and says knowingly, "I've got 'em on the hip." He goes to D and says, "Look here; I am just out of that sarsaparilla. Sell me six dozen or lend them to me." He has those goods in stock, you understand, but they are marked "A." Now, D's goods go down to the cutter, and are found in the cutter's store; and D has to accept the responsibility, although D is innocent. They can take and juggle those figures right along for six months. Then they will send to Philadelphia and do the same thing. That is just the point; the question of numbering goods is out of order entirely—you can do nothing with it. We tried it in the Campion plan, and I predict that numbering goods will fail every time, as it has up to date during twelve years' experience.

The only thing that will not fail is, that when A is known to supply these persons on the prohibited list, for the whole community to turn round and say, "Mr. A, if you supply that establishment again, all of us united will not buy a dollar's worth of goods from you." That will soon bring him to reason, and that I consider is one of the grand features of this plan. If, Mr. Chairman, this was the first time in the history of the trade or protective organizations that a similar system had been attempted, I would say it is probably a mistake or an error; but thousands of them have done it, even down to the hod-carriers. Whenever they get together, they will "git their dollar an' sivinty-foive cints a day, or, begorrah, we'll walk aroond fur tree months." The great trouble with some of our retailers is that if they lose five cents they will sit down and take a dose of bromide of potassium. They are so grieved that they don't think about the other losses. But with the introduction of true union among druggists in all these communities, you will find

the trade will go right back to its natural channels every time. The man you used to sell proprietary articles to will come back to you, and will not go to the cutter.

Now, sir, let me say further, that I believe that ethics take a very strong part in a great many professions; it is so in almost all of them except in pharmacy. Even admitting that it is a semi-profession on the one side, yet the responsibility for every article which you sell is in the hands of the pharmacist every time, especially the educated one, and, therefore, that is something, and it is worth while standing up for. There is no use in my proceeding any further on this subject, and, in closing my remarks, I want to say to my friend, Mr. Canning, that I don't think that he was right when he said he would not allow any further appropriations to be made by the American Pharmaceutical Association. I don't know of any more harassing question than this one of bread and butter, and that is why I will stand up for this fight until the last foe is vanquished. When Mr. Kline sent me his circular about the legal opinions of those to whom he had applied, concerning the tripartite plan, I told him something to this effect, that I was an American citizen and believed I had some rights guaranteed to me under the Constitution of the United States, and that I claimed the right to live, and always will until my last breath, I hope. I will be one of the men that will test the legality of that plan with any manufacturer in the country, either as an association or as an individual. I will sell my goods where I choose.

President Finlay here took the chair:

MR. TORBERT: I would like the privilege of reviewing the situation and the arguments presented here this morning, as I think some of them are misleading, and on some points we appear to be at difference where we are in agreement. For this reason, whatever the verdict may be here, whether it is in favor of Mr. Alexander's resolution, of which I myself am in favor, or whether it should be against it, I do not want to have any one vote on the question who has any misapprehension of the situation.

Mr. Canning (and you all know there is no man in this Association who has a more profound respect for Henry Canning than I have) may be mistaken in his judgment, and if he is, he is man enough to be willing to recognize it if he is so convinced; and if a majority of this Association shall decide in favor of Mr. Alexander's resolution, no man will accept the majority position more gracefully than he. He asks the question with a great deal of directness and pertinence, "What will the proprietors do when we present them this resolution?" I answer, believing in the proprietors, that they will discharge the agreement which they honestly and solemnly made with this Association, that they would put the plan into effect which it would formulate. Mr. Canning states that we are only two hundred here, and that, therefore, this is but a very infinitesimal fraction of the pharmacists of this country. Does he forget that this is a representative Association, and, although we may have a representation here of only two hundred, yet we represent the pharmacists of this country? We represent them as truly as the gentlemen sitting in Congress at Washington represent the entire people of this country. Now, as a matter of fact and supplementary to that, we have here State after State, petitioning this Association to put the A. P. A. plan, with which they are thoroughly familiar, into immediate effect. Do you forget that this Association is made up of the men who make these petitions? Do you forget that they are the life, the sinew, the blood of this Association? And shall it happen that here, to-day, in New Hampshire, the American Pharmaceutical Association shall turn its back upon these petitioning state associations? No; I sincerely hope not.

Mr. Kline, in his remarks, made a confession which I am glad he has made, and I think he will probably be surprised when I call his attention to it. You will remember that he said that this plan should be submitted to the vote of the retailers, and that when

twenty thousand retailers should petition that this plan be put in force, it would be done. I would ask Mr. Kline, in all candor, if that is true, what has become of these mighty legal objections that have been raised? If this can be done when twenty thousand retail pharmacists have asked for it, I submit, why may it not be put into effect when the Pharmaceutical Associations of this country—nearly from Maine to California—are asking for it? The American Pharmaceutical Association stands by its action regarding this plan. It not only originated this plan at the suggestion of the proprietors, but it sent its representatives to Louisville, and the plan was accepted, with certain modifications, particularly the omission of the substitution clause. The proprietors have approved the plan, and all that stands in the way of its enforcement, it has been represented, is the legal objections; and we have it from so good an authority as Mr. Kline, that if twenty thousand retail pharmacists shall approve of it, it can be put in operation. Now, gentlemen, I beseech of you in the interests of the pharmacists of this country, to stand up for the resolution that has been offered, for, as I tried to show you, unless pharmacy is protected along this line, there is nothing in pharmacy for pharmacists.

Mr. Torbert resumed the chair.

MR. ELIEL: I would like to ask the Chairman whether he has an account of the number of state associations that have accepted the A. P. A. plan?

THE CHAIRMAN: I will state that we have here the action of Indiana, Illinois, Florida and Iowa, primarily from their officers. I have been advised that South Dakota and Maine have taken similar action, and there are representatives from Missouri here who can answer for that State. I understand, however, that every state association that has had its meeting since last spring has made this same petition to the Association.

DR. ECCLES: The remarks made just now in answer to Mr. Kline, which, it seems to me, arose through a mistaken construction on the part of Mr. Kline, do not touch the main position taken by him, that a combination is illegal, for a study of the law of conspiracy will show clearly that whereas individuals may object to sell to certain others, and sell where they choose, yet no society or body of men can get together and conspire to prevent others from having the tools of their trade. These goods, as long as they are sold by retailers, are tools of trade of the retailers, and you are never allowed to conspire to prevent any one from using such tools. The law of conspiracy everywhere is in favor of Mr. Kline's position. But the tripartite plan, it seems to me, is also contrary to the universal law of nature, going in the direction of least resistance. It seems to be going, not in the direction of least resistance, but in the direction of greatest resistance, for experience in all lines of business, and in conducting conferences and conventions like this, shows us that the fewer people you have to do with on your committees, the better is the work done; for when you overdo your work by large committees, you get so much confusion and trouble that you cannot come to any decision. It is precisely the same with this tripartite plan, in its three groups; every one could do the work, if every one wanted to do it. The trouble is that nobody really wants to do the work himself. Everybody wants some one else to do it, and there is the bottom of the whole affair.

The manufacturer or the proprietor could relieve us of this trouble if he wanted to. Mr. Seabury says he cannot, but he can; if he wants to, he can stop the cutting on his own goods. If any proprietor throughout the country wants to, I care not who he is, he can stop it. But he does not want to, and there lies the trouble. He would find it necessary to go to the extra trouble and expense of selling direct to the retailers, and having no middle-men to cheat him. But by this plan he could put an end to it so far as his goods are concerned, and every proprietor could do this self-same thing if he wanted to, and the middle-man could do it if he wanted to. If the middle-men were to unite in their efforts to put an end to this thing, they could accomplish it; but they are

not willing to come to an agreement, nor will they ever be willing until they are on the same foundation as the retailer—until you have withdrawn the rebate from the wholesaler and men who supply the retailer, and they have started cutting among themselves. Whenever they get to cutting, and come down to bed-rock, so that they are making nothing, and actually losing more than they make, then they will be willing to help the retailer; but I do not think you will be able to get them to do it until then. The retailer, on the other hand, is anxious to do business in the only way possible, and he is solving the problem beautifully. He is doing this in spite of the words of opprobrium hurled by Mr. Seabury against the retailer regarding substitution, which is a fearful word, for it has an awfully bad implication. But is it really substitution? I believe that if you are going to exalt that word substitution to such an honorable position, that it would be well for us to understand it and glorify it, for it becomes the very salvation of pharmacy, and the best word that the pharmacist can bow down to and worship. Such a plan of substitution is the key to the whole problem, and the method that nature is pursuing in solving this vexatious matter; not by false representation on the part of the retailer, but by the mere statement to his patron, "This is my own; I know what it contains, and I am sure it will help you. This is somebody else's. Nobody knows anything about its manufacture. It may never be twice alike. Probably that made yesterday may be totally different from that which the manufacturer is turning out to-day. If it benefitted you yesterday, it may not benefit you to-day or any other day. You have no evidence, except that of a man who perhaps knows nothing about the thing himself; he may be a blacksmith, who has gone into the business of providing these concoctions for you. And the result is that I, a retailer, can assure you, as a pharmacist, that my preparation can benefit you, but the other I know nothing about, and when you take it, you take it on your own responsibility." Is there any harm in that? I say no, and if you call that "substitution," then let us glorify the word, and in the next edition of Webster's Dictionary have an exalted definition for it.

Mr. Seabury told us that the prescribing by physicians was due to substitution on the part of the retailer. It is nothing of the kind. The dispensing by physicians is due more to people going among them and teaching them to use patent medicines instead of patronizing the pharmacist. It is because the retailer allowed himself to be imposed upon in the past and did not substitute. If the retailer had always substituted (and I am using the word now with the new meaning they have given it) the medical man would not have been led into this trap of supplying his patients with articles, the composition of which he knows nothing about; the introduction of these preparations has had more to do with it in our city, and I suppose elsewhere, than anything else.

I believe Mr. Seabury has misrepresented the facts also in regard to the number of pharmacists that are under the control of the middle-men. He said, I think, that there were 60 per cent. I don't believe that there are 5 per cent. in the city of Brooklyn. Of those that I know of there are certainly not that number, and I know quite a large number of them, and that they have their ready cash, can buy where they choose, and pay their bills promptly.

The whole question must finally resolve itself into the processes of nature in the struggle for existence, the survival of the one that goes in the direction of least resistance, and that is the method of "substitution," which will compel the manufacturer to die or help the retailer.

MR. CANNING: So much truth has been stated by the last speaker that I do not rise to refute his statements in the least. I would like to see something in the line of his speech embodied in a resolution, and I think that it would have a great deal of meaning, coming from this organization. But I rise more particularly now, because the remarks of the speaker who is now occupying the chair were more particularly directed to some

remarks made by myself earlier in the session. I must defend my own side of the case, and I can simply say for the gentleman what he said of me, that I know if this house sees fit to endorse my amendment rather than the original motion, he will also gracefully accept the decision of the majority. I want to say about what we are recommending, that there is a point which has not been considered. There has been much talk to the effect that while some legal opinions have been given against the A. P. A. plan, you would find as many opinions the other way; but that is merely hearsay, which may or may not be of any weight. A case has been suggested here, which I do not consider at all analagous, in regard to the whisky trust; but it must be remembered that it has probably convinced the government that it is a stock company, and is one concern. But you can in no way construe a combination of patent medicine men as one concern, nor will they consent to go into one concern. I think, therefore, that that is a refutation of the statement which compares the whisky trust to a patent medicine combine.

Now, I repeat, we are telling them that "we reaffirm our belief in the A. P. A. plan." There were four opinions, all from very able men. Three were against it, and only one in favor of it. I say three against it, because one might be construed as somewhat doubtful, but the probable construction put upon it by the majority would be that it is also against it. At any rate, it would still be two to one if that were thrown out. So that we are reaffirming our belief in what we know, up to this time, is illegal. That is poor ground for us to take, it seems to me. It is very well for us to say, it is likely that we can find many other lawyers to say it is legal: but first let us act on what advice we have up to this time. It has also been stated many times during the year, in the pharmaceutical press, that the committee ought to eliminate whatever might be objectionable in the plan, and go ahead with it. It must be borne in mind that that elimination would mean eliminating the whole plan, because no plan can be successful without some form of concerted action. We will all take that ground, I suppose. The moment you eliminate the objectionable points, you throw out the whole plan, because you can do nothing without concerted action.

As to this organization here assembled representing a body similar to our own Congress, as has been stated, there is one point that has been overlooked by the gentleman who made the statement. When our representatives go to Congress they pass laws for us, we are bound to obey them; but we cannot do the same for the rest of the trade throughout this country. They are not bound to obey our laws. Up to this time they have not obeyed them, and there is no probability that they will do so in the future. And that is why I wanted to embody something in a resolution that would have some meaning, and not reaffirm our belief in what up to this time has been shown to be illegal.

The other point, which appeared to be a very strong one, is that if this can be accepted by the proprietors when twenty thousand druggists in the United States ask for it, it can also be equally acceptable if the various organizations throughout the country, representing those twenty thousand druggists, ask for it. There are also two sides to that question. Twenty thousand druggists would mean a great deal. The voice of twenty thousand people, instead of this body or the state organizations representing those people, would mean business, and it would be impossible for any proprietor or any body of proprietors to run the risk of going counter to their wishes. Test it with twenty thousand druggists behind your back, and they would undoubtedly soon accede to your terms. It seems to me, however, that we have not got this twenty thousand, and that is the difference between these two views.

THE CHAIRMAN: Now, as I understand the situation and the discussion, both by yourself and Mr. Eccles, it is, that the objection is the legal one entirely.

MR. CANNING: Yes, as far as the Committee is concerned.

THE CHAIRMAN: And your argument seems to be that this Association should not propose the performance of an act which is illegal. Now, I would ask, first, if you do not recognize that nothing can be determined to be illegal until it has been so decided in the courts? Until then, it is only a matter of opinion.

MR. CANNING: I should certainly have to say yes.

THE CHAIRMAN: A second question. Your amendment proposes an organization. With any organization you may have, you will have to have a plan. Now, if you are accurate as to what your plan conceives, the very basis of the plan on which this amendment would organize, would itself be organized on a plan which would be illegal.

MR. CANNING: That is not in my mind. I have in my mind that no plan would be necessary at all, that they would follow on the principle given us so plainly a few minutes ago by Dr Eccles, that the proprietor would see to it himself with twenty thousand druggists forcing him to do it. With local organizations combined throughout the country as one body, it would be for his interest to do it, and plans would be thrown to the dogs; that is my idea about it. That is what I mean about local organization and doing away with the A. P. A. plan. We can do nothing with it if it is not legal. We cannot reaffirm our plan, and what, up to this time, we have been advised is illegal. That is what I mean by it exactly; Dr. Eccles struck the very point. If you could say to them, "This is the whole trade of the country asking for it," we wouldn't want any plan then.

MR. SEABURY: At this time I must make the simple statement that I have always found that the average druggist in a large community lacks what we call backbone; if we depended upon the organization of twenty thousand retail druggists without some directorate to encourage them, they would never organize. I take the practical position; the theoretical position is taken on the basis of first corralling the twenty thousand. In the same manner the statement was made by the speaker preceding Mr. Canning, that I could stop a certain thing if I chose to. How can I? There are more than seventy-five concerns in this country that have certain goods in their stock, and I will take my oath I never sold them a dollar's worth. Now, when a man wants to treat a practical question, he must not do it with theory; we have had theory from the Campion plan until the present time. I repeat the point which the Chairman has made, that this case has not yet been decided; and when the assault is first made, if we can get fifteen or twenty manufacturers to enter an organization and separately defend their own goods in the market, then I think it is high time to test this question, and we will have a great many years to decide it in. But don't let us have any more theory about it, but get down to practical work.

DR. ECCLES: Mr. Seabury knows very well that it is not theory. I have only to point to my collar and that is what I mean. There is a collar manufacturer who is selling more collars, than Mr. Seabury sells plasters, and they do not sell through the wholesalers, and no cutting is done by them.

MR. SEABURY: That is an argument that has been repeatedly brought before the Association. That is a collar, and not a patent medicine question. They sell to the retailer and not to the wholesaler at all, and a man who violates their prices cannot have the goods.

THE CHAIRMAN: When the question arose touching substitution, I was in the chair, and Mr. Seabury having noticed it, with corresponding courtesy I allowed Mr. Eccles to follow the discussion; but the judgment and decision of the Chair is, that the question of substitution is not before this body. The question is, the resolution offered by Mr. Alexander, and the Chair will request the gentlemen to address themselves, in future, to the resolution and the amendment offered by Mr. Canning.

MR. BARTLET: Regarding the resolution offered by Mr. Alexander, I hope that it will prevail, and I hope that Mr. Canning's amendment will also prevail, for I believe that Mr. Alexander's resolution will be of no effect whatever unless some resolution similar to Mr. Canning's prevails. I hope that Mr. Canning will, if necessary, so alter his amendment that the resolution and amendment will not conflict. I believe it is impossible to carry out any plan without a large endorsement from the retail trade. No matter how zealous a few men may be—and it has been tried time and time again—you can do nothing, in my opinion, without the backing of the retail trade. This is no new story. I was one of the originators of the National Retail Druggists' Association, and was upon its Executive Committee during the whole trial of the Campion plan. The only success that has thus far been achieved in this country toward relieving druggists from their many troubles has been done in a small way, in local organizations. Now, we must, in my opinion, carry out in a large way some of the methods pursued in the local organizations. The way that they meet with success is, that they have a large backing to start with. These actions are always taken by a few, but they have backing of a large majority of the druggists in the immediate vicinity. The legal aspect of this matter wouldn't frighten me at all. I have had some experience with legal matters in connection with laws that undertook to regulate our business. There is about one per cent. of law that is the real thing, and about 99 per cent. that is pure bluff. Now, let me tell you that in the city of Boston we wished to accomplish a certain object, to sell a certain article on Sunday that we claimed we had a perfect right to sell. Not one of the lawyers that I consulted with in Boston would sustain me in the position that we had this right. On a certain Saturday policemen visited all the druggists in Boston, and informed them that they must not sell this article on the next day. They came to me, and I said, "If you come in to-morrow, I will sell you all you wish of that article." I have sold that article ever since on Sunday, and so has every druggist that desired to, in Boston, and legally, too. When you come to study law and get down into it, you will find that it is usually the smartest lawyer who wins, and it is the one who makes a study of the thing, and goes into it deepest, and does the most fighting, that comes out the best finally. Now, the only thing you have to do when you are driven to a corner unjustly by the law is to get around it, and if you employ a lawyer who has had sufficient experience, he will get around it for you, and that is what we ought to do in this case. Supposing that three or four lawyers do tell you that this thing is illegal, what do they know about it? They know nothing definite about it; it is only their opinion. It is only settled definitely when it has been decided by the courts. An association of people came to me as president of a local organization, and told me that I must not do thus and so. I asked why. They said, because it is illegal. I said, "Well, take your case into the supreme court." They have never carried it there yet, although they had the written opinions of lawyers to show me that my position was wrong legally.

I have no faith in the sincerity of jobbers as a whole, although there are exceptions. During the cutting in Boston I had no difficulty in getting all of Hood's goods, although I did not sign his agreement. Mr. Hood undertook to sell to the cutters and the retailers. Afterwards, he attempted to protect the retailers when it was too late, and that is where he failed. He did not get the backing of the retail trade, and he boldly asserted that he did not care for it when he started, and you see where he landed.

The matter of cutting, in other lines of goods, has been remedied by selling direct to the retailer. I have been all over Boston trying to get E. & W. collars for twenty cents, and I can't do it. So you see that cutting can be stopped, if the manufacturers wish to sell the articles direct to the retail trade. I think, however, it can also be done in the manner proposed, provided we get the full endorsement of the retail trade, or a large endorsement, with aid of our present energetic Committee, and fight it out to the bitter end.

MR. BASSETT: I wish to state my position in regard to this question, having been interested in it for a number of years. One of the leading points made in opposition to the success of this plan is the lack of backing from the retailers. Now, gentlemen, let your mind go back for a few years, and listen to the clamor that has been made by the retail trade of the United States for the last ten years, and then answer me what right have the members of this Committee to come here and say to us, "We want the backing of the retail trade?" Just go back to our meeting at New Orleans, something over a year ago, when the manufacturers and proprietors sent the telegram to us reading, "If the American Pharmaceutical Association will adopt any plan, we will put it in force." Do you think they had any question then as to the backing of the retail trade to this Association? I think not. We adopted a plan and sent it on for their approval; they then asked us to send delegates to the National Wholesale Druggists' Association, which we did. We went there in force and laid the plan before them; they wished to modify that plan in some respects, and we very gracefully submitted to the pruning of that plan until it was perfectly satisfactory to that dual body of jobbers and manufacturers and proprietors. They adopted it, and we appointed our part of the Tripartite Committee to carry out the plan. The jobbers and the manufacturers of proprietary articles gave us to understand at that meeting that this plan was to be carried out. Now, what is the next thing we hear about this plan? At the second meeting of this Committee we find that two parts of it have arrived at the conclusion (and it would appear from the arguments presented to-day, that they won our part of it over to the same view) that this plan is illegal. And yet, in spite of its illegality, they say, "If you will get us the signatures of twenty thousand retail druggists, we will put it in force." They might as well have said every retailer in the country, because they know it is an impossibility, under existing circumstances, for the retail trade of this country to get the signatures of twenty thousand men to this plan, or to request twenty thousand to carry it out. All this has happened in spite of the assurances of the jobbers at Louisville, and now my personal opinion is that no plan will ever be a success. Why do I think so? Simply because I do not believe (and I say it without malice or intent to be harsh) that the Almighty Himself could formulate a plan that the jobbing trade of this country would live up to. Allow me to illustrate by one single incident why it is that I make this strong statement. I said that at Louisville we were led to suppose, in so many words, that if we would go home and organize (this organization is a wonderful thing!) and then send to Mr. Kline (the Secretary of the Jobbers' Association, I believe) an official communication from an organization to the effect that we do not wish any cutters in our town to be sold goods, they would comply with the request. After a few months, in our city, Detroit, we had a grocer who thought it would be an elegant thing to put in not merely proprietary goods, but a regular drug store. A committee was appointed to call upon this gentleman and see what he proposed to do, and he told us what he was going to do; we labored with him with what success we might, but it was no good. He went round the city and tried to buy his supplies. The jobbers there, knowing the temper of the druggists' organization in that part of the country, to a man refused to sell to him, and stated to us that they would get the Lake Erie Drug Association to notify its members not to sell to this man. They did so, and he was unable to buy any goods in the territory. We immediately wrote to Mr. Kline an official letter to the effect that we did not want to have this man supplied. The man, however, secured his first supply of goods from Chicago. We immediately sent over to Chicago, to some of the retailers, and asked them to use their influence as retailers upon their jobbers, and stop it. They were so much interested that they took the matter up and sent a man over to our place to explain why they had sold those goods, and refused to sell any more. Afterwards he bought goods in New York. Now, this was right in face of the exact line of conduct that had been mapped out for us in Louisville, and it was done through an official organization. We control

our home trade, but fail to get any redress through the National Wholesale Druggists' Association, after they have promised so distinctly that if we would organize and ask officially, we should have it. That is why I say there is no success in an organization of that kind. They heard the cry not only of twenty thousand druggists, but that which has gone up all over the United States, the cry that means bread and butter to the retail pharmacists of the United States. While Mr. Seabury may be in excess in his figures of what the jobbing trade own in the State of New York, I do not believe he is much in excess as to what they control in some of our western states. I know for a certain fact that most of the retail druggists in our state are carried by the jobbers, and are practically under their thumb; they have them right by the throat. We have done our share; let us stand to our guns and reaffirm in this resolution that we have formulated the plan for you, which we believe is feasible. They find no trouble in carrying out their rebate plan. I don't know whether that can be regarded as an illegal combination or not.

MR. CANNING: I would say that the reason why the rebate plan is carried out so well is, that nobody contests it and nobody wants to. The jobbing trade is a unit on it.

THE CHAIRMAN: Didn't these attorneys who affirmed that the A. P. A. plan is illegal, also affirm that if put in practical operation nobody would interfere with it very much?

MR. CANNING: One or two of them might.

THE CHAIRMAN: That is the situation exactly.

MR. CANNING: No. I must reply that it is not the situation of the jobbers. There is this difference: if you put that plan in force among the retail trade, and have any success whatever, it is sure to be contested. That is a foregone conclusion. The men who have been underselling, and cutting our noses off, are not going to lie down and die without contesting it.

MR. ELIEL: I would like to go back to ancient history and mention the Campion plan, having been one of the Executive Committee at the time that that plan was put in force. The Campion plan is identical with the plan we are asking for now. Just as soon as the manufacturers saw that that plan was a success, they found an excuse for withdrawing. The same will be the case with the A. P. A. plan to-day.

MR. BASSETT: I take issue with Mr. Canning when he says the jobbers are a unit. I assert that there are jobbers in this country, that any man in this room can name, that no sooner do they hear of a cut-rate store than they send in their circulars, offering to sell their goods. We do not expect, and it is useless to expect, that you can get the thirty or forty thousand retail druggists of the United States to be a unit on this question; but we do expect that by the support of the jobbers and the manufacturers of goods, that we can become so strong that we can stamp out this evil to a great extent. We have taken all the trouble and all the care that we should, we have subjected this plan to the revision of the jobbers and manufacturers. Now, then, let us re-affirm this plan, and send it back to them and say, "Gentlemen, you must enforce this plan," and if they do not, it is time, I think, for us to enforce it in some other manner.

DR. ECCLES: You started out by saying you did not believe any plan could be enforced. Wouldn't it be mere buncombe for us to refer it back just at the close?

MR. CANNING: You don't believe in it yourself.

MR. BASSETT: I don't believe any plan can be enforced until we get the support of these people, and I don't believe these people are sincere—that is what I meant to have understood. But if we can bring it home to them in such a manner that they can be forced to take it up, we will achieve some success.

MR. CANNING: Mr. Bassett, I think, bears out my side of the argument beautifully, when he cited that case which happened in Detroit. They succeeded, in Detroit, in keeping those goods from the cutter by local organization. They succeeded, through the Erie County organization in keeping him from getting goods in that market, and so through the Chicago organization. They did not have a local organization in New York, and the man got the goods.

MR. BASSETT: Let me answer by saying that there are wholesale firms in New York, and one in Boston, that do not care how their goods are sold; and that is the reason why these plans are not a success. If we can bring this class of people, who are not now interested in the question, to our support, something might be done.

MR. CANNING: Would you have had the same state of affairs in Detroit under similar circumstances? I think not. In New York they have no local organization, nor in Boston, but in Detroit you keep the jobbers from cutting your noses off by your local organization.

MR. FINLAY: I would like to say a word or two about my own experience. At the meeting of the wholesale druggists, manufacturers and proprietors at Louisville, I was present with one of my colleagues. While there, we saw enough to point out to us a solution of the problem before us. We had not suffered much, but previous to leaving our city we had discovered that there was danger before us; that our city was gradually falling into the hands of the cutter. When we saw the temper of the people we met at Louisville, we remembered that on the same day our Association was to hold a meeting. One of the objects of the meeting that day, on the part of some of the members, was to bring up and split, and let all of us go free-footed. We telegraphed them to hold together, and we would have a special meeting when we returned to the city. On our return, a committee was at once appointed with orders to canvass the retail trade. We went in person, first to the men we knew were all solid, and got their signatures. We knew pretty well what the temper of the trade was in our town, and by coralling the willing ones first, the other element we knew would be less unwilling. We finally got the recalcitrants to a man, with but two exceptions. Then we went to the wholesale men, and said, "Gentlemen, the only way we can bind the trade is by a compact in which you yourselves are interested. Will you sign a compact that you will not sell to any retailer in the city of New Orleans, nor fill any order you receive at less than retail price of same, if he be on the cut-off list, or if he be reported as a cutter?" They said, "Yes, we will do so." Why? Because those jobbers themselves had suffered; they were carrying men on their books month after month, owing them, who had been cutting prices. The wholesale men all signed, and at once prices were restored to full value. Just before leaving the city to join this Association, I was telephoned by a member of the trade, that a certain party was receiving goods from a wholesale drug store, and if they did not stop furnishing that man goods he would not buy from the firm any more. I called on that house in person and stated the case. They said the cutter received the goods without their knowledge, but they were serious in what they intended to do, and I am assured that the party has since been cut off. So the city of New Orleans has succeeded in getting full prices. There is no doubt the best way to succeed is for some one or two in a city to see the men themselves, get those who are most willing first, and gradually bring them all in. It seems, too, that such action as this would greatly fortify the Tripartite Committee, and I wish that every man within the sound of my voice might constitute himself a missionary to do that work. If we let others do it, it won't be done; so let us put our hands to the plow, and go through to the end.

MR. SHEPPARD: I will guarantee to Mr. Finlay his expenses and ten thousand dollars in cash, if he will put Boston in good shape.

MR. FINLAY: If Mr. Sheppard's friends will do what I proposed to do, there will be no necessity for paying the money. Let him and his friends go around among the others, and use their arguments.

MR. SHEPPARD: The men who hurt us are not our friends; they are the other ones.

MR. FENNEL: About fifteen months ago, I was a young man, full of vigor, and an enthusiast on the subject of cut rates. Since that time, I have passed through the different ages of man, and to-day you find me old and decrepid, and no longer possessed of the enthusiasm I had before. I have been accused repeatedly of attempting the feat of riding two horses in two directions, a professional and a trade one. I admit that I have been doing it, but the two horses have been running steady paced, and each has gained its goal. The American Pharmaceutical Association recognizes that about eighty per cent. of the druggists in the United States do not belong to the profession, and therefore established a commercial section to protect their interests. It doesn't concern this Association whether the plan adopted is illegal or legal; it is the duty of this Association, according to the promise made to the druggists, to offer the plan to the manufacturers who demanded it from the American Pharmaceutical Association, and say, "Here is the plan: now you enforce it." If this Association now declines to accept that plan or refuses it, then it stultifies its position towards these men, and the honor of the Association is at stake. This is the first meeting at which we have presented a complete plan, and one that is formulated not alone by members of the American Pharmaceutical Association, but by the National Wholesale Druggists' Association, and the Proprietors' Association. It is the plan, we submit, of the three associations, and we are now ready to meet the request of the manufacturers, saying, "Here is your plan: now you carry it out," and that is all that is wanted. Whether it is legal or illegal does not concern us.

MR. HECHLER: Before we vote upon this question, I believe it would be well for you gentlemen here to hear something from northern Ohio. I think Cleveland can boast of being a city where there is no cutting, and is probably the second largest city in the State, and in the Union, where such a state of affairs exists. This was accomplished only by judicious work. It was done with the co-operation of the jobbers and the manufacturers. We can assure you that our jobbers have always worked with us, hand in hand. We never started out to abuse them, we always worked with them in harmony, and they have always come to our aid whenever their help has been required. I will illustrate with two or three cases.

A dry goods concern started in our city; advertised in the papers that they were going to open a drug department, and announced their prices, at cost, in a good many articles. We held meeting after meeting, and invited our jobbers. They responded to our invitation, and we appointed a Committee which visited the house. They talked to the head of the firm, and showed him what a folly it would be to antagonize from fifty to a hundred druggists, and assuming that in the city where they were doing business that these men had friends. What was the result? We bought their goods at what they cost, removed them out of the house, and had freedom for two or three years. Another retail concern started it, and we did the same thing; we bought their goods and had freedom, until lately when we have had a small concern, cutting a little, connected with a dry goods house. They have done us no harm, however. We do not mention it to any one. They wanted a thousand dollars bonus of us to quit. As soon as they talked in that way we dropped them, and never went near them again. It doesn't hurt us a particle. But, I want to say to you gentlemen, you will never accomplish anything unless you go at it with the manufacturer and jobber in a harmonious way, organize your trade, and educate them into the belief that by selling at cut rates they cannot accomplish very much.

MR. MARTIN: I have not heard the fact mentioned that this plan is now virtually in operation in this country. It certainly is being worked in Chicago, although in another trade. Under the rules of the Plumbers' Trust there, you cannot buy anything in the plumbing line unless you happen to be a practical plumber. I had an experience of that kind. I wanted to buy some zinc, and was referred by the plumber to the manufacturer, no reason being given me for doing so. I went to a hardware store, but they said, "You must go to the manufacturer." I went to the manufacturer, and he said, "You must go back to the plumber; he is the only man that can sell it to you. We haven't any right to sell these things except to a practical plumber. The Plumbers' Association won't allow it." So I had to go back to the plumber and get the zinc from him. Now, if this tripartite plan is illegal, why isn't that illegal? No one has questioned the legality of it, and no one has contested it. I doubt whether the cutters will go to the expense of testing the case, when they consider that there are twenty thousand druggists in the country who are willing to stand by the manufacturer. Let the manufacturer show his sincerity in the matter. Let us again reaffirm this plan, and then make the manufacturer show whether he is sincere or not.

At the request of Mr. Hechler, the resolution and the amendment under consideration were read by the Secretary, as follows:

*Resolved*, That the plan of the A. P. A., as ratified by the Joint Committee of the National Wholesale Druggists' Association, the manufacturers of and dealers in proprietary medicines and the American Pharmaceutical Association, be reaffirmed; that this Section requests the Manufacturers of and Dealers in Proprietary Medicines Association to put this plan in operation at the earliest possible moment.—Offered by M. W. Alexander.

*Resolved*, It is the sense of this Association that relief from cut-rate evils can only be obtained by general request of the retail trade through local organization.—Offered by Henry Canning.

The question being taken on the amendment offered by Mr. Canning, on a rising vote it was declared lost.

The original motion offered by Mr. Alexander was then unanimously carried.

The Secretary read the resolution offered by Mr. Martin at the first session, which was seconded by Mr. Sheppard.

*Resolved*, That all proprietors and manufacturers of medicinal preparations be urgently requested, at the earliest practicable period, to devise such simple methods of marking all packages of their articles intended for retail use, as will facilitate identification of the source of supply of such goods.

It was explained that this resolution was not intended to alter the plan which had been just now reaffirmed, but was intended as a recommendation to the manufacturers, and that it deserved favorable consideration, more particularly in case the former plan should be declared illegal in the courts; moreover, that such a system had already been adopted by one manufacturing firm.

The resolution was unanimously adopted.

Mr. Ebert offered the following resolution:

*Resolved*, By the Commercial Section of the American Pharmaceutical Association, at its fortieth annual meeting in convention assembled: That it hereby instructs its delegates to the meeting of the National Wholesale Druggists' Association, and that of the Manufacturers and Proprietors and Dealers in Proprietary Medicines, that they respectfully request these organizations, as the plan of the American Pharmaceutical Association has been accepted for the control and regulation of the cut-rate problem, that this plan be put into practical operation at as early a date as possible."

Mr. Fennel seconded the resolution, and it was unanimously adopted.

Mr. Hallberg presented the following:

*Resolved*, That the American Pharmaceutical Association urge thorough local organization in every centre, for the purpose of supporting the plan of the American Pharmaceutical Association.

MR. KLINE: I would like to say something in favor of that motion, because I feel, after what Mr. Bassett has said, that some remarks are necessary in regard to this feature of the question. Mr. Bassett believes that what Providence could not do, namely, to regulate the wicked jobber, a combination of retail druggists could do, and had done it, and were doing it. Mr. Finlay followed to the same effect. I submit that the remarks which Mr. Bassett did not mean in that sense—indicating that the suggestion from the Committee was of no value as long as we had jobbers—were entirely refuted by his own statements, and those of Mr. Finlay, that it is the correct course, and only through that means can anything be accomplished. I sincerely hope that the resolution now being acted upon will be taken up by the members here, and taken home, and that the organization and all this consolidation will materialize.

MR. EBERT: Will you allow me to ask Mr. Kline one or two questions regarding a matter which affects us largely in Chicago, and which I would also like to have the Association to know something about.

THE CHAIRMAN: I believe there will be no objection.

MR. EBERT: The Secretary of the Chicago Retail Druggists' Association, if I am not mistaken, addressed a letter in the name of that body to Mr. Kline, notifying him of the establishment of a cut-rate store in Chicago. They also notified Mr. Merriam, of Minneapolis, the Secretary of the National Wholesale Druggists' Association, to the same effect. We heard nothing from Mr. Kline or Mr. Merriam, though the cutter is established there and is supplied with goods from a New York house, which claimed recently that they furnished those goods because they were not aware that they were to be sold in a cut-rate store. I asked the gentlemen who represented that house whether the house was a member of the National Wholesale Druggists' Association, and they said they were, but had never received any notice. Now, at the meeting of the National Wholesale Druggists' Association in Louisville, at which I was present as a delegate from Chicago, we were told that in case of trouble we were to communicate, by letter, with Mr. Kline, or the Secretary of the National Wholesale Druggists' Association. I would, therefore, ask Mr. Kline whether he received our communication, informing him that such a store was to be opened in Chicago, and whether any steps were taken to notify the wholesale drug trade and prevent it?

MR. KLINE: I am glad the question has been asked. The communication from Chicago did reach me. The communication sent to the Secretary of the National Wholesale Druggists' Association also reached me, because to me such communication

ought to be addressed. I haven't my letter book here, but it is a very remarkable thing if my Secretary did not immediately acknowledge receipt to the proper party in Chicago. I know that the very moment it was received a memorandum was made, and the very next list which was sent out, as I could prove if I had that with me, contained the name of the drug store that you refer to.

THE CHAIRMAN: That statement of Mr. Kline's I am able to confirm. It was on the list.

MR. KLINE: I make this statement because many members misapprehend the scope of the cut-off list. It does go, so far as I can get the names, to all the proprietors who are selling goods on the rebate plan. It also goes to all the jobbers on the books as active members of the National Wholesale Druggists' Association, or who are on the books of the Ayer Company, who issue a list of their own; they were kind enough to send me their list, and I use them both. This cut-off list, at the present time, notifies the proprietors not to recognize direct orders from any such parties—and that is the one original purpose of it—to which has been attached during the present year, a proscription from ten or twelve proprietors, but in addition to that, requesting jobbers not to supply parties with proprietary medicines who are on that list. The list did not contemplate (and probably that is where Mr. Ebert gets confused) any action by the National Wholesale Druggists' Association, which would direct that no drugs shall be sold to the houses so named. That is a matter of altogether another nature and local in its character. The platform of the local organizations, as Mr. Bassett has stated, contemplates such action. I understand that occasionally the National Wholesale Druggists' Association has agreed to do it, after communications were received from these local organizations. I will only add, once more, to clinch what Mr. Bassett has assumed to think so lightly of, that these local organizations, governing themselves on that platform, and insisting on that position, can, as Mr. Ebert well testified, obtain that action, and they are obtaining it in Chicago, in the Lake Erie region and in St. Louis.

MR. BASSETT: I would ask what good does a local organization do in preventing our home trade from selling to cutting concerns, when the people in the east and west can sell them? We don't want to keep our own trade from selling to these people, and yet allow the eastern dealers to do so.

MR. KLINE: What I said this morning, and again repeat is, that if twenty thousand druggists will make it manifest to any house in New York city that that is their position, and insist upon it, I think the New York wholesalers are as wise as those in Detroit, Chicago and St. Louis, and will heed the request. This, however, has nothing to do with the cut-off list.

Mr. Hallberg named a house that for several years had been on the cut-off list.

MR. KLINE: On the list of a proprietor. All proprietors have their own lists; and, by the way, that is an important piece of information in reply to what the chairman said so eloquently a while ago in reference to the difference about legal opinions. That is precisely the gist of the legal opinion, that a proprietor, individually, has a right to do all this, and no lawyer has ever said that he had not; but they did say that no two men could combine together and agree upon it.

MR. SEABURY: Suppose twenty combined together on the same principle, who were members of an organization, but unofficially and not as an organization. Would that make it a conspiracy?

MR. KLINE: They would not be an organization then. They would be acting individually.

MR. SEABURY: What is to prevent me, if a member of that Proprietors' Association, which is composed of about one hundred and twenty members, any more than seventeen on the membership list? Can you make the whole organization responsible for conspiracy on account of seventeen?

MR. SHEPPARD: I would like to say a word on this motion, which, of course, inferentially has a bearing on the previous question. It seems to me that the struggle for the past ten years proves one thing absolutely. I will just illustrate my point by suggesting that we imagine a big stream coming down from one of these mountains is subdividing into as many small rivulets as there are towns and cities in the United States. If we want to stop the flow of that stream completely, we must go directly to the fountain head. If we happen to be on either one of these little streamlets, we can prevent its flowing over our territory by working on that little streamlet, and can, perhaps, do it partially by preventing its coming down in one direction if it does not trickle from another. Now, it seems to me that that is a fair illustration of this question, and the remedy is only to be had at the fountain head. If you are going to stop the stream—or, in other words, stop the whole wickedness—there is only one way to do it, and that is by the proprietors only. I think that the history of this subject shows us absolutely that the fountain-head can be reached only by the proprietors; that each of us, by local organizations, on each little stream, can help our respective districts, but that if we expect by damming up the stream that flows through our town or city, to decrease the great downward flow, we are mistaken. Mr. Hallberg's motion, however, will help each locality, if we will only put it into working shape; but don't let us pass this resolution with the idea that we are damming up the main stream, because the whole question must finally come back to the position exactly where Dr. Eccles put it, that the proprietors, when the iron has burned deep enough into them, will realize that they have got to do something in order to sell their goods, and that it is the proprietor only who can cut off that stream where it starts. Let us simply recognize the fact that this local organization will do partial good in each locality, but is not likely to go beyond that.

DR. ECCLES: There is only one thing which can teach mankind wisdom and experience, and that is usually a matter of experiment. Although I can see that positive failure will attend the plan adopted this afternoon, yet I am perfectly willing to put my hand forward and advance this plan to the best of my ability, so that the experiment may receive a fair and straightforward trial. I believe that Mr. Hallberg's resolution will assist in giving it a fair opportunity, and I would therefore like to see it adopted.

Mr. Hallberg's motion was now put to a vote and unanimously adopted.

The Chair stated that at previous meetings the Chairman's address had not been referred to a special Committee, and that Mr. Alexander's resolution covered the pith of the Chairman's recommendation.

Mr. Canning moved a reconsideration of the motion appointing a Committee on the Chairman's address. The motion was duly seconded, and, on a vote, was declared lost.

Mr. Seabury moved the following, which was duly seconded and adopted:

*Resolved*, That the State Associations which have not yet convened, shall be notified by the Secretary of this Section that the American Pharmaceutical Association has reaffirmed the plan passed last year for the protection of our trade, requesting them to pass a similar resolution.

Mr. Seabury likewise offered the following, which was seconded and adopted:

*Resolved*, That we request that the proceedings of the Commercial Section be specially printed as soon as possible in pamphlet form, and sent to every member of the American Pharmaceutical Association.

Mr. Dadd presented the following resolution:

*Resolved*, The most sincere and grateful thanks of this Association are hereby tendered to the Tripartite Committee for their untiring and persistent efforts in behalf of the interests and welfare of the retail pharmacists of this country.

The motion was seconded, and, by a rising vote, carried unanimously.

Mr. Eliel presented the report of the Nominating Committee, recommending for Chairman of the Section, W. H. Torbert; for Secretary, Arthur Bassett; and for Committee, C. O. Rano and G. L. Hechler.

Mr. Canning here took the chair.

On motion of Mr. Alexander, the Chair cast the ballot of the Section for the names presented by the Committee, whereupon the nominees were declared duly elected.

The Chair appointed Messrs. Hallberg and Finlay a Committee to conduct the newly-elected officers to the platform. The officers being presented, Mr. W. H. Torbert, the re-elected Chairman, spoke as follows:

Gentlemen, I thank you for the honor conferred. I cannot say that I am grateful in the least for the work you have imposed. And I would like to express myself as I understood a most excellent woman recently expressed herself, after visiting Boston. The story runs, that some ladies from New England were visiting that city, and the Boston ladies drove them about the beautiful boulevards on which we were driven, and visited with them the places of historic interest; they enjoyed, as we did, in a magnificent way, the hospitality of the people of Boston, were taken to the parks, to the theatre, on one evening to hear Jeanness Miller, the dress reformer, and on another evening to hear Ingersoll. In course of time, the ladies returned to their New England home, and their mother was anxious to have a report of her daughters' visit to Boston, and they said to their mother that they thought Boston was a beautiful city, but that its social views were revolutionary and dangerous and awful—"Mother, just think of the doctrine: no corsets, no hell!"

The action of the Association in re-electing the Chairman of the Commercial Section, in my judgment, is both revolutionary and awful; but I have never yet refused to take up any duty that will aid along the line of advantage and helpfulness to the retail pharmacists, and I never shall.

Messrs. Hechler and Rano briefly acknowledged the honor of election, and promised to earnestly co-operate in carrying out the plan that had been adopted.

MR. BASSETT: I thank the Association for the honor of this election. With our able chairman, I shall do everything in my power toward furthering the interests of this Association. I feel that there is a great deal at stake. It seems to me, in looking over the

country, that the business of selling medicines, the business of the pharmacist, is in a transitory state. We are changing, and I hope we may change for the better. I hope that every member at this Section will use every effort possible locally towards carrying out the wishes that have been expressed here; and if we do that and do it earnestly, we shall come up to our meeting a year hence with good reports.

MR. CANNING: With such a solid front, we can expect something enormous next year. I rise, however, for the purpose of stating what I consider the present status of the tripartite committee. I consider that its work is completed. We have done all we could. The Association, as I understand it, has now taken the work up, and reaffirmed its belief in the plan that the committee have tried to put forward, and of course the duty devolves upon the officers of this Section to attempt to carry out and enforce it. I realize, therefore, that it would be the proper thing for this Association to discharge its part of the committee. There are still two parts left, and we don't know what those parts might do when one part has gone. For that reason, it would seem to me that being an organization in itself, from these three bodies, having its own chairman and secretary, that the only way to dissolve that committee is for it to dissolve itself. I do not, therefore, ask for a discharge of the A. P. A. part of the committee, taking the view that the committee would dissolve itself by its own action.

Mr. Martin moved that any reference to economical drug stores of Chicago be stricken from the minutes, which motion was duly seconded and carried.

THE CHAIRMAN: Mr. Canning has suggested a very important matter, and I take it that his position will be the correct one, that if no action were taken, our part of the committee will be practically dismissed, and will dissolve itself, the other Sections doing the same thing.

MR. EBERT: This Section should, in my opinion, send a delegation to the National Wholesale Druggists' Association and to the Proprietors' Association, which meet in Montreal. The American Pharmaceutical Association sends such a delegation, but as we are a law to ourselves seemingly, it seems to me that we might appoint a delegation independent of the American Pharmaceutical Association to act upon Mr. Alexander's resolution, and in any other way that might be to the benefit of this Association.

MR. CANNING: Mr. Ebert brings up a very important point. I think for the last two years the delegates have been unwisely appointed to represent this Section. I have taken that ground with our present president and vice-president. I think that they should be appointed from this Section as representing commercial interests. There is no by-law in regard to that. This Section is a body, to a certain extent, so when the proper time comes, it seems to me the chairman should appoint the delegation to the National Wholesale Druggists' Association. In the meantime, this Tripartite Committee has completed its work, and being a complete organization will dissolve itself.

MR. SHEPPARD: It seems to me that the constitution of the American Pharmaceutical Association, and the inherent law, is quite plain, that all work of this Association is annual in its character, and expires at the end of the year, when all elections excepting for members of the Council, must take place. This Committee, therefore, whatever it may be, closes its duties at this time, and a new Committee will have to be appointed by some one. It seems to me that that is inherent in the constitution and by-laws of the Association.

MR. GOOD: It occurs to me that if the Association pays any part of the expenses of

this delegation in attending the meeting, that the Association must send them. There is no difficulty in getting men to act on that Committee, who are active in this section, and therefore I take the view that the delegation we send there should be appointed by the Association, and the suggestion made from this Section.

MR. WHELPLEY: I agree with the speaker, and think in case the Commercial Section were to appoint delegates to visit the National Wholesale Druggists' Association, it would follow that the Scientific Section should appoint delegates to visit the American Medical Association or other scientific bodies.

Mr. Hallberg moved that this Section recommend the appointment of the officers of the Section with the addition of Mr. Canning as a Committee to visit the National Wholesale Druggists' Association. Mr. Sheppard seconded the motion, which was then unanimously carried.

MR. SHEPPARD: I don't see that the appointment of this Committee to visit the National Wholesale Druggists' Association gives them any authority to act for the American Pharmaceutical Association, except in a general way as delegates. Now, I move that these gentlemen, Messrs. Torbert, Bassett, Heckler, Rano and Canning, be appointed a special Committee of the Section on Commercial Interests to aid in the plan for the prevention of cutting.

The motion was duly seconded and adopted.

On motion of Mr. Sheppard, it was voted that the Section recommends to the Association the appropriation of a sufficient sum of money to defray the necessary expenses of the Committee.

On motion of Mr. Sheppard, the Committee on the Chairman's Address was instructed to report to the Association at its last session.

The Section then adjourned.

# MINUTES

OF THE

# SECTION ON SCIENTIFIC PAPERS.

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FIRST SESSION—SATURDAY MORNING, JULY 16.

After the adjournment of the fifth session of the Association, the Section on Scientific Papers was called to order by Chairman Hallberg. In the absence of Secretary Snow, Mr. C. T. P. Fennel was appointed Secretary, *pro tempore*.

The chair then read his annual address as follows:

*Members of the American Pharmaceutical Association:* In presenting the result of the work entrusted to this Committee during the past year, we beg to offer a few suggestions for your consideration. While the number and quality of papers presented to this Association is, perhaps, as great as could be read and profitably discussed, it is felt that contributions are not always received from such quarters or upon such subjects as would still further add to the interest and enthusiasm of the sessions. In the busy life of a pharmacist little opportunity presents itself to expend the time and care required in investigations of a character acceptable to this Association.

The standard required by this Association may possibly be held an exaggeration by many who are not accustomed to write on scientific subjects; but the fact remains, that while progress has been made during the last ten years, in both the number and quality of the contributions, it has scarcely been as great as appeared warranted by the great advances made in the pharmacal sciences. Although the *number* of papers alone is not an exact criterion of the interest displayed in this branch of the Association's work, still it furnishes a fair basis upon which the amount of work may be judged, as well as in a general way the degree of activity in the line of research.

The number of scientific papers received by this Association was as follows during the years named:

| | | | |
|---|---|---|---|
| 1891 | 25 | 1885 | 38 |
| 1890 | 23 | 1884 | 23 |
| 1889 | 34 | 1883 | 20 |
| 1888 | 17 | 1882 | 17 |
| 1887 | 16 | 1881 | 16 |
| 1886 | 24 | 1880 | 15 |

The number of scientific contributions received by this Association does not, therefore, apparently keep pace with the great advances made in the profession. Suggestions have

been made from time to time relative how best to bring out work for this Section. With thirty odd institutions teaching pharmacy in this country, it does appear as though the showing made by this Association is a rather poor one. Some of these institutions do considerable work in the line of investigations, but reserve them for their own use and publication. While this may be expected, it is believed that a certain number of contributions of especial value could always be referred to this Association, where they may receive more extended notice and consideration.

The Association, aside from its various prizes, offers opportunity through the Centennial Fund for members to receive financial aid in investigations, which has however seldom been embraced. Many advanced students would no doubt be glad to avail themselves of this offer, if their attention were directed to it. It is recommended that teachers in colleges be requested to institute such work by qualified students as may be deemed desirable or indicated by the Queries annually proposed, to be carried out under their direction, and according to the conditions of the award of the Centennial Fund.

In connection with the work of this Section a subject is submitted for consideration, which, while directly concerned with scientific investigation, has also a direct and important bearing upon the material interests of pharmacists.

Observation has disclosed the fact that but very little of the immense amount of scientific facts accumulated every year, is of any real or practical value to the vast majority of pharmacists—few pharmacists are enabled to derive any substantial advantage from the many new remedies, processes, formulas and devices that are offered, usually free, by investigators throughout the world. Not until these processes, formulas, etc., have been appropriated by some one else, does the pharmacist become directly interested in them, and then only at a disadvantage. The appropriator—that is the manufacturer, who promotes the interest in a certain article among the medical men—as soon as fairly established, dictates to the dispenser the terms upon which this alleged property shall be sold. The project of the National Formulary was a great step in the right direction to secure to pharmacists the result of the labor and investigations of pharmacists. But it is equally important that information concerning the many new substances not therein included, should be furnished to the medical profession by the pharmacist rather than by the manufacturer, or, as is often the case, by dealers not especially qualified in pharmacy. To be of the utmost utility, such information should be in a convenient and concise form. It is practically impossible for any single pharmacist to undertake the collection and publication of such matter, in connection with such other information as would be desirable and be greatly appreciated by the medical men.

Collectively it would be quite feasible to make such compilation. It is recommended that this Section appoint a committee of three, including, if possible, one medical man, to undertake the compilation of an ephemeral compilation containing brief descriptions of the medical properties, uses and doses of such new remedies as appear from time to time, together with such pharmacal preparations as may have become sufficiently known to warrant it. Such compilation should be published in convenient pamphlet form at such intervals as may be deemed expedient, say quarterly, and be distributed to the medical men by pharmacists in their respective localities; the publication of such work to be undertaken by the committee, without expense to the Association.

In conclusion, the Chairman desires to express thanks for the aid rendered him by members in the presentation of the work which comes before this Section.

C. S. N. HALLBERG.

On motion of Mr. Remington, seconded by Mr. Oldberg, the address was referred to a committee of three for consideration and report; the chair appointed Messrs. Alpers, Culbreth and Martin said committee.

The report of the Committee on Prize Essays being called for, Mr. Whelpley stated that the committee would report at the next session.

THE CHAIRMAN: The Section has received some twenty-nine papers. Among them there are quite a number that may possibly come within the scope of the prizes which are not specially provided for in the General Committee on Prize Essays. Three prizes are offered by this Association, according to the resolution adopted at Cincinnati, for papers that may not be of as high a character as to entitle them to the prize of the Ebert Fund or to grants from the Centennial Fund. It is advisable, therefore, inasmuch as some of these papers have been marked for competition, that a committee be appointed for the purpose of examining them. The chair will appoint as such committee Messrs. Good, Rusby and Patch. The committee will report at the last session as to which of the papers presented may, in their judgment, be entitled to prizes, exclusive of the Ebert prize.

The Local Secretary, Mr. Whitney, introduced Mr. Graves, of Portland, Me., who, with a few happy remarks, illustrated by parable, extended the hospitality of the Maine druggists to the members of the Association.

Nominations for officers of the Section being next in order, Mr. Ebert nominated C. T. P. Fennel, of Cincinnati, for Chairman, and Mr. Bedford nominated Mr. Frank G. Ryan, of Philadelphia, for Secretary.

No further nominations being made, the election was laid over for action at the subsequent session, and the Secretary was instructed to post the names in the hall as required by the order of business.

Mr. Fennel read the following paper in the absence of the author, and subsequently Mr. Curtman read his essay on amyl nitrite, showed the apparatus and made an assay.

## THE PRACTICAL USE OF CHEMICAL SYMBOLS IN THE PHARMACY.

BY W. W. KERR, BATESVILLE, ARK.

QUERY No. 50.—Would not chemical symbols in addition to the officinal titles be advantageous on the labels of shelf bottles?

It needs little argument to establish the affirmative of this proposition; the advantages of the innovation appear on the surface.

It is important, not only to know what is contained in the bottles, but also what is contained in the contents. The ordinary labels tell the one; the chemical formulæ the other. Our very familiarity with the former tends to place the knowledge of the latter so far in the background that it is, if not forgotten, so lost to view as to be practically but a shadowy reminiscence. It would be startling, doubtless, if accurate statistics were obtainable, to know how few of those who are engaged in manipulating chemicals daily, are able to tell on the moment, or perhaps even after study, the chemical constitution of substances. If all the pharmacists in this country who are reckoned competent were drawn up into line, after counting out the recent graduates from the schools and those who make chemistry a specialty, perhaps not one in a hundred could hold up his hand if a question involving this information was suddenly propounded, and yet the im-

portance of knowing not only *what* these chemicals are, but *of* what they are, is too patent to need discussion, since *what* they are depends upon *whence they came*, and we can never be said to know the one until we have traced the other to its last analysis.

The chemical formula not only indicates the ultimate sources of the substance, and the relative proportions in which they have combined to form it, but it presents to the mind a picture of the mystical union which serves to impress us with an idea of its true nature; and if the picture be constantly before the eye, the impression will also be constantly upon the mind.

The advantage of having these formulæ upon the containers of chemicals begins with the beginner and runs through to the end of the term, gathering force the while. The attention of the apprentice when he first enters the store is naturally drawn to the mysterious hieroglyphics upon the shelf bottles. To the uninitiated these are indeed a mystery, and when the opportunity is offered, the novitiate seizes it with avidity and a zealous desire to solve it, and the impressions made upon an ardent mind are never erased. As his eye glances over the glittering array of gilt labels, it lights, it may be, upon the words "Pot. Brom.," which upon inquiry he ascertains to be an abbreviation of the Latin words "potassii bromidum;" in English, bromide of potassium, or as he may know it better, bromide of potash. As this is a chemical with which he may be somewhat acquainted, he perhaps concludes that he now knows all about it, and it is not impossible that he might have finished his career with knowing little more, if a second look had not revealed another still more mysterious sign—"KBr." His curiosity is still further aroused to fathom its meaning. He is told that it is a chemical symbol which shows the origin of the substance; that "K" stands for kalium, another name for potassium, and "Br." for bromine, and together they mean that one equivalent of each have combined together to form the crystals before him. Near by he sees another name, "Pot. Iod." or "Iodid." His previously acquired knowledge tells him that this must be another member of the potassium or kalium family, and his further investigations inform him that it is the iodide, and that the characters "KI" mean that it comes from kalium and iodine. Of course his mind can by no means grasp the whole, nor indeed more than a mere glimpse of the truth; but a picture in outline has been photographed upon his memory which will never be obliterated, and in after years when he comes to take up the chemistry of the subject and study the nature of the subtle force which steals the atoms from one substance and attaches them to another, it will be but the filling in of the outlines; at least, through all his after life, there will be associated with the names of the chemicals he handles, not only the source from whence they came, but a vision of the process by which they were moulded together.

The usefulness of the contemplated addition to the inscription on labels is not exhausted by its application to the beginner as an educational force; the educated and experienced pharmacist cannot afford to lose sight of the truths taught by these chemical symbols, as he is apt to do if the object lesson is not constantly before his eyes. Familiarity not only "breeds contempt," but often forgetfulness, and the very fact that it is possible to conduct the various pharmaceutical manipulations without calling to mind each time the elemental constituents which make up the substances acted upon, even assuming that they had once been familiar to him, causes them to fade from his memory, so that he often gets into trouble through some unexpected chemical reaction for which he is at a loss to account, and for which he *cannot* account until he stops to recall, or refers to his books to hunt up that which should have been uppermost in his mind when the experiment was attempted. Even in the simple chemicals before alluded to, what an important figure do the little characters "Br" and "I" cut; how prominently do they stand out as danger signals, and what trouble would be apt to follow a forgetfulness of their presence! While forgetfulness as to *these* may not be probable, they serve to represent what might be a mountain of difficulty in the case of others more complicated in their structure, and not so well known.

More than this, these hieroglyphics not only portray the atomic and molecular union of the ultimate constituents which have entered into bond, but they exhibit the value of each compound in its combination with another. They also furnish a clew to the compatibility or incompatibility of various chemicals, and thus an added safeguard against mistakes. In short, if a knowledge of chemistry be an essential qualification of the competent pharmacist, then whatever tends to keep that knowledge prominently present with him in all his work, should be encouraged, and it will hardly be denied that the addition of chemical formulæ to the official titles on shelf bottles, is a step in that direction.

## AN EXAMINATION OF THE AMYL NITRITE OF PHARMACY.

BY DR. CHARLES O. CURTMAN.

The preparation to which the U. S. Pharmacopœia assigns the name of *Amyl Nitris*, and the German Arzneibuch that of *Amylium Nitrosum*, is made from the amyl alcohol, or rather the rectified fusel oil, obtained by distillers as a by-product of the manufacture of alcohol. The fusel oil is not of uniform composition, but varies considerably according to the material used for fermenting. Not only is there generally a considerable amount of the ordinary ethylic alcohol present in the product, but it contains, in addition, several of the alcohols richer in carbon than the ethylic, such as the propylic, butylic; some isomeric varieties of the amylic and still higher alcohols; also small amounts of various aldehydes and acids, and a variable amount of water.

The crude product is purified by agitation with strong brine, which dissolves the ordinary ethyl alcohol, together with a great portion of propyl and butyl alcohol, furfurol and other aldehydes and the soluble acids. An oily liquid remains undissolved and is distilled off, and the fraction passing over between 125° C. and 140° C. is separated and sold as "*purified amyl alcohol.*" From this material the amyl nitrite of pharmacy is generally prepared.

It is evident that fractional distillation can only separate those ingredients whose boiling points are materially higher or lower than that of the fraction preserved. So we find, as a matter of course, in the purified amyl alcohol a number of the admixtures which were originally present in the crude product. Fusel oil from potato spirit [which is much produced in Germany] contains principally iso-amyl alcohol and ethyl alcohol, and therefore furnishes, by the above-described treatment, a very pure and uniform product. Fusel oil from maize whiskey [which forms the principal part of that produced in the United States] contains besides the iso-amyl alcohol, small amounts of its several isomeric varieties, (normal amyl alcohol, lævo-rotary methyl-ethyl-carbin-carbinol, etc.) also iso-butyl and propyl alcohols.*

With a difference in the amyl alcohol from which the nitrite is prepared, we have to expect a difference in the final product, and hence we find that while imported amyl nitrite, derived from the potato, consists almost entirely of the nitrite of iso-amyl, the American product contains the nitrites of the other isomeric varieties, etc. Whether these have different physiological or medicinal effects, remains to be investigated.

But besides these differences arising from the mixed nature of the amylic alcohol used, and which can hardly be considered in the light of real impurities, there are liable to be present a number of other substances in amyl nitrite, principally due to imperfections in the manufacture. Among these is an amount of *unchanged amyl alcohol* and *amyl valerianate*, which however can be removed by careful redistillation at 100° C., when the amyl nitrite will boil and distil over, while the unchanged alcohol and the valerianate require a much higher temperature.

If nitric acid be used in the preparation, larger amounts of *amyl nitrate*, as well as *valerianic aldehyde* and *acid* are liable to form, but as its use has recently been almost entirely superseded by that of nitrous acid (potassium nitrite and sulphuric acid), these products occur in less quantity than in the product manufactured by the older process.

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* Among the isomeric amyl alcohols, found in grain fusel oils, are the following:

Iso-amyl alcohol, boiling point 131.6° C., sp. grav. 0.8248.

Active methyl-ethyl-carbin-carbinol, boiling point 128° C.

Methyl-propyl-carbinol, boiling point 118.5° C., sp. grav. 0.8239.

Methyl-iso-propyl-carbinol, boiling point 112.5° C., sp. grav. 0.819.

Tertiary amyl alcohol, boiling point 102.5° C., sp. grav. 0.812.

*Nitropentane*, an isomeric modification of amyl nitrite, is also less frequently found now, since the use of nitric acid has been abandoned.

If ethylic alcohol has not been entirely removed from the amyl alcohol, *ethyl nitrite* will also be present, and occasionally *butyl nitrite* can be found in some quantity, and materially modifies the odor.

Some of the impurities are not originally present in the freshly distilled product, but result from decomposition, especially by light, as the habit of preserving in colorless bottles still prevails to a great extent. Among these are valeric and other aldehydes. Nearly all of the above-named impurities can be readily removed by careful fractional distillation, excepting valeric aldehyde, butyl nitrite, and water.

The tests for purity prescribed by the U. S. P. (1880) are:

The boiling point at about 96° C., which makes allowance for the peculiar composition of American fusel oil, for the amyl nitrite made from pure iso-amyl alcohol boils at 99° C.

The specific gravity is given at 0.874, which makes a similar allowance, for the pure iso-amyl nitrite has a specific gravity of 0.905 (Flückiger, Bunge, etc.). Then a test for water is given, demanding that, when refrigerated to 0° C., the product shall remain clear.

Finally, as a limit of acid, it is directed that 10 c.c. of amyl nitrite, after agitation with 2 c.c. of a mixture of 1 part ammonia water and 9 parts of water, should yield a liquid which does not redden litmus paper.

The German Arzneibuch directs a boiling point of from 97° C. to 99° C., corresponding to the product from purified potato fusel oil, and a specific gravity from 0.870 to 0.880, which still permits the presence of some lighter material (such as unchanged iso-amyl alcohol, ethyl nitrite, etc.).

The tests for absence of water and the limitation of acid are the same as in the U. S. P. To these is added a test for absence of aldehydes with ammoniacal silver nitrate.

A quantitative test is not given in either Pharmacopœia, and yet it would be easy enough to base one on the percentage of nitrous acid in combination. This would not guard against the presence of other nitrites (ethyl, propyl and butyl nitrites would count for full, and even more than full, on account of their lower molecular weight); but it would serve, in connection with the tests for identity and those for limit of impurities already prescribed, to exercise a greater control over the article. That such a control is necessary, the great diversity of percentage found in the commercial product will amply prove.

Several methods are suitable for ascertaining the percentage of nitrite in any sample, and all of those practiced for the analysis of the spiritus ætheris nitrosi may be so modified as to apply to amyl nitrite. In a series of papers read before the Missouri State Pharmaceutical Association a few weeks ago, I have discussed these methods somewhat in extenso, and beg leave to refer to those papers, recently published, for a detailed description of a variety of volumetric and nitrometric processes of analysis.

For the examination of a number of specimens of amyl nitrite, collected from various sources, and for many of which I am indebted to the kindness of friends, I have adopted the method devised by Allen for spirit of nitrous ether, which gives prompt and accurate results. The instrument used for the purpose is a modification of the nitrometer of Lunge, who first devised this useful apparatus. Fig. 1 of the accompanying plate shows the original instrument of Lunge, designed for general use with nitrates. Fig. 2 shows his later arrangement for the analysis of saltpetre. Fig. 3 represents Allen's instrument, and Fig. 4 a modification of this, made by myself, having bulbs at the bottom of the tubes for the reception of the reagents so as to avoid their passing into the open tube and thus occasioning loss of gas.

Each instrument consists of a graduated measuring tube with stopcock and cup on top, and an open equilibrium tube, connected with the measuring tube by stout rubber tubing. Figs. 1 and 2 have the so-called 3-way stopcock, permitting the attachment of apparatus to the side tube. Figs. 3 and 4 have the ordinary stopcock with single bore. They are fastened by screw clamps to the upright rod of the common iron support used in laboratories.

The chemical reaction upon which the nitrometric method is based, is the conversion of amyl nitrite by the addition of potassium iodide and sulphuric acid into amyl alcohol, potassium bisulphate, free iodine, and nitric oxide. The latter—also called nitrogen dioxide, NO, or $N_2O_2$—is measured in the graduated tube of the nitrometer, and from it the amount of amyl nitrite is readily calculated. The equation reduced to the simplest proportions would read:

$$C_5H_{11}NO_2 + KI + H_2SO_4 = C_5H_{11}OH + KHSO_4 + I + NO.$$

From this it follows that each molecule of amyl nitrite yields one molecule of nitric oxide, or that 116.78 grams of amyl nitrite yield 29.97 grams (measuring 22321.2052 c.c.) of the gas. Hence it will require 0.5231797 grams of amyl nitrite to yield 100 c.c. of NO gas, and if such amount be used in the nitrometer, each c.c. of gas will correspond to one per cent. of amyl nitrite. The volume of the gas must however be first reduced, so as to correspond to the normal conditions adopted by physicists for measuring gases, *i. e.*, to the volume the gas would occuy at 760 mm. of barometric pressure and at 0° C.

The analysis is made as follows: The measuring tube of the nitrometer is filled up to the stopcock, including its bore, with a saturated solution of sodium chloride in water, the stopcock is closed and the equilibrium tube emptied, so that only a few cubic centimetres of the solution are allowed to remain in its bulb. The tubes are so adjusted to their support that the measuring tube stands as high, the equilibrium tube as low, as the fastenings will conveniently permit. Next, 0.523 gm. of the amyl nitrite, diluted

with about 5 c.c. of alcohol, are introduced into the cup, and by careful opening of the stopcock are transferred into the graduated part of the tube, without admitting air. To secure this, a few drops are left in the cup and washed down by the repeated addition of a few c.c. of the salt solution which is used for filling the instrument. The reagents for decomposition are best used in the strength of normal volumetric solutions, and in the quantity of 10 c.c. each, so that uniformity may prevail in the difference of specific gravity in the two tubes.

The solution of potassium iodide is therefore made to contain 165.59 gm. of KI per litre; the normal sulphuric acid contains 48.91 gm. of $H_2SO_4$ in 1 litre.

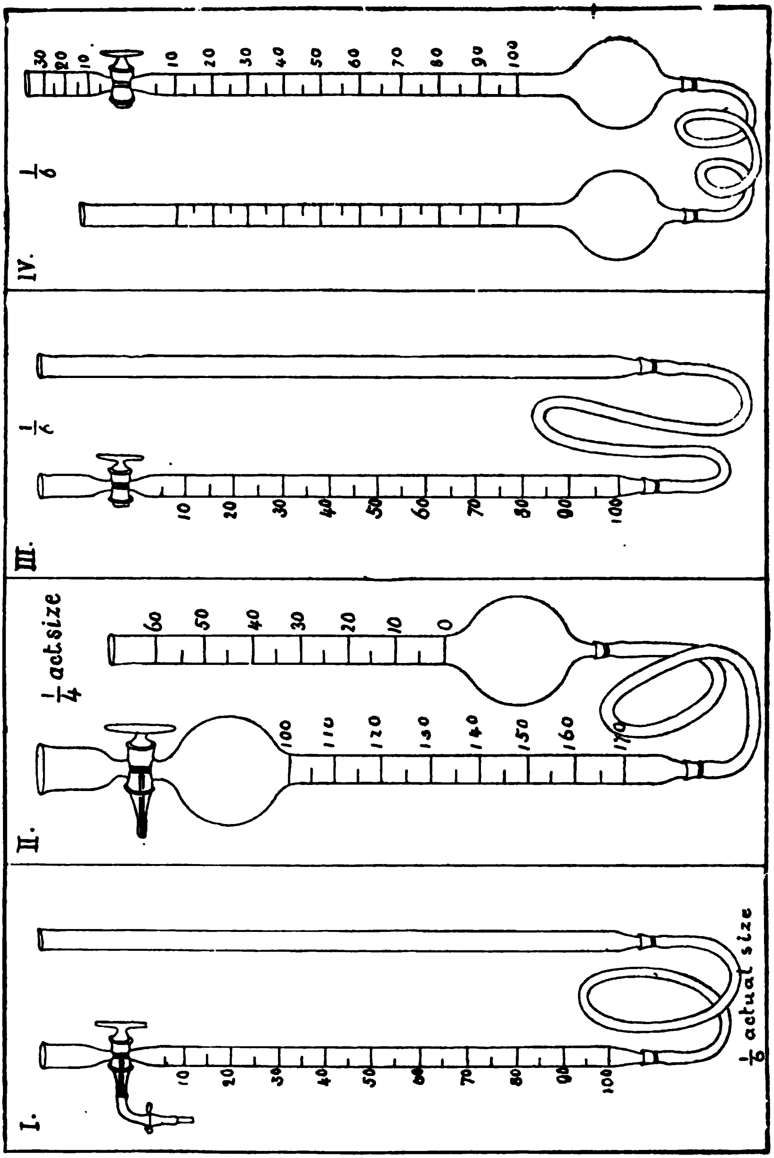
After the introduction of the sample of amyl nitrite 10 c.c. of normal KI solution are next introduced, followed by 10 c.c. of normal sulphuric acid, using the same precautions as before against the admission of air. A strong effervescence now ensues, and while the gas fills the upper portion of the graduated tube, the reagents are pressed down, but still, on account of their mixture being specifically lighter than the salt solution, they mix but little with it and float on top. Some agitation is necessary to favor the rapid and complete evolution of the gas. The reaction is generally finished inside of five minutes. The two tubes are now so adjusted that the liquid in the equilibrium tube stands about 3.3 c.c. lower than that in the measuring tube, and the number of c.c. of NO gas evolved is then read off and noted. The correction for temperature is now made by dividing the number of c.c. by the number of c.c. to which one cubic centimetre of gas, measured at 0° C., will expand when raised to the temperature prevailing at the time of making the experiment. This number is found on the following table:

CORRECTION OF GAS VOLUME FOR TEMPERATURE.

1 c.c. of gas at 0° C. becomes at

| °C. | c.c. of gas. | °C. | c.c. of gas. |
|---|---|---|---|
| 10 | 1.036630 | 26 | 1.095238 |
| 11 | 1.040293 | 27 | 1.098901 |
| 12 | 1.043956 | 28 | 1.102564 |
| 13 | 1.047619 | 29 | 1.106227 |
| 14 | 1.051282 | 30 | 1.109890 |
| 15 | 1.054945 | 31 | 1.113553 |
| 16 | 1.058608 | 32 | 1.117216 |
| 17 | 1.062271 | 33 | 1.120879 |
| 18 | 1.065934 | 34 | 1.124542 |
| 19 | 1.069597 | 35 | 1.128205 |
| 20 | 1.073260 | 36 | 1.131868 |
| 21 | 1.076923 | 37 | 1.135531 |
| 22 | 1.080586 | 38 | 1.139194 |
| 23 | 1.084249 | 39 | 1.142857 |
| 24 | 1.087912 | 40 | 1.146520 |
| 25 | 1.091575 | | |

FIGS. 1, 2, 3 AND 4.



No. 1. Lunge's Nitrometer for general use. 1/6 actual size.

No. 2. Lunge's Nitrometer for saltpetre. 1/4 actual size.

No. 3. Allen's Nitrometer. 1/6 actual size.

No. 4. Curtman's Nitrometer. 1/6 actual size.

The size of the plate has been reduced to one-half of the size of the drawing.

The volume of gas must still be corrected for difference of pressure, if the mercury of the barometer does not indicate the normal pressure of 760 mm. (about 30 inches). The correction is made by multiplying with the number of mm. of the present pressure, and dividing by 760 (or multiplying with the present pressure in inches and dividing by 30). The number of c.c. thus corrected gives the per cent. of amyl nitrite in the specimen.

By this method I have examined a number of samples from different sources, and give the results below, using initials instead of names, so as to distinguish, without divulging the source from which they were derived. In any complete analysis it would, of course, be necessary to add the other tests for purity ordered by the pharmacopœia, but for present purposes it will suffice if I only report the percentage of nitrite found, calculated as amyl nitrite.

| | | |
|---|---|---|
| M. C. W. Average of 3 samples | 76.24 | per cent. |
| P. D. (Pearls). Average of 3 samples | 67.827 | " " |
| M. B. 1 sample (contains much amyl valerianate and some butyl nitrite) | 27.14 | " " |
| H. F. Average of 2 samples | 66.36 | " " |
| S. Q. | 65.35 | " " |
| S. Q. Sample used on prescription desk three months | 39.60 | " " |
| M. In sealed glass tubes | 84.235 | " " |
| M. Same after one week's standing in white glass vial | 71.32 | " " |
| L. S. Average of 2 samples | 59.33 | " " |
| C. | 93.71 | " " |
| M. B. | 81.37 | " " |
| C. P. & Co | 73.81 | " " |
| P. & W. | 37.68 | " " |
| M. (in glass stoppered bottle). | 83.03 | " " |
| R. & S. | 33.90 | " " |
| Sa | 86.13 | " " |

From the foregoing it is evident that too great a diversity exists in the strength of so potent a remedy as amyl nitrite, and that this might easily lead to dangerous results. When a variation of a few drops in the dose is capable of turning the scale between life and death, there should at least be a guarantee of uniformity. Else one who has been using a ten-drop dose of a 50 per cent. preparation with impunity, might have his life endangered by using the same dose of a fresh supply of another brand, having 80 per cent. of the pure amyl nitrite, for this would at least equal 16 drops of the former. Physicians and patients are liable to suffer from the uncertain state of the article, and pharmacists should be prompt to apply the remedy.

This consists not only in securing uniformity in the strength of the preparation, when first made, but also in preserving it with the utmost care. And among the means to accomplish this preservation there stands foremost *protection from light.* Containers of the darkest brown glass should be chosen, aided by wrappers of opaque paper, and by position in the

darkest part of the storeroom or prescription desk. Besides these, well-fitting stoppers and the coolest possible storage are necessary aids in delaying decomposition. Enclosure in hermetically sealed pearls is certainly a very eligible mode of preservation, if aided by protection against the influence of light, and by accurate dosing.

The brevity of the time which I was able to devote to the investigation of the subject, has necessarily limited me to the sole feature of the percentage of nitrite present, but there is certainly room for closer inquiry into other points, such as the nature of the 20 and more per cent. of impurities mixed with the real amyl nitrite. For these are by no means to be considered in the light of mere diluents, but their presence may modify the properties of amyl nitrite to a greater or less extent. Addition of methyl alcohol to amyl nitrite rapidly converts the mixture into amyl alcohol and gaseous methyl nitrite, which escapes. Addition of ethyl alcohol more slowly changes the mixture into ethyl nitrite and amyl alcohol, both of which have different properties from amyl nitrite. Is it then impossible that the presence of other substances could also change the properties of the pure article? The safest plan appears to be to exact the highest practicable percentage of purity, so that the admixture of foreign substances, whatever they be, will not be of sufficient amount to impair the properties of the pure preparation.

MR. CASPARI: Would it do to wash out the upper tube with alcohol?

MR. PATCH: I would ask whether allowing for a small quantity of air admitted, by subtracting it from the volume of the gas, would not answer every purpose?

MR. CURTMAN: There would be a great deal of difference on account of the air containing oxygen, which would combine with some of that NO gas that is to be measured, and form with it nitrogen tetroxide, and as this gas is soluble in water, an indefinite amount would disappear, and we would have a loss.

MR. F. S. THOMPSON: Would the use of bicarbonate of potash not hinder the decomposition of amyl-nitrite and ethyl-nitrite during storage?

MR. CURTMAN: I hardly think that it would do so. It would rapidly remove the products of the decomposition, but it would not prevent the decomposition more rapidly than without this addition. The main factor with ethyl-nitrite and amyl-nitrite is perfect exclusion of light for preventing the formation of aldehyd, etc.

MR. CASPARI: You suggested the use of concentrated brine. Do you use the concentrated brine here, or a more dilute solution, to avoid crystallization?

MR. CURTMAN: I use a perfectly saturated solution. There is not a great difference in the percentage of salt in a saturated solution at different temperatures, because in boiling water the salt dissolves to nearly the same extent as in cold water. The precipitation is occasioned by the addition of the amyl-nitrite. I simply keep a large bottle standing in my laboratory with a surplus of salt in the bottle, and pour off the clear solution at any temperature that may happen to be, and it is for such a saturated solution that the calculations of specific gravity are made. There is, of course, a small difference in the saturation point at different temperatures, but it is really so small that it may be ignored.

MR. CASPARI: I referred to crystallization at the line of contact.

MR. CURTMAN: When amyl-alcohol or nitrite comes in contact with the salt solution, the salt not being soluble in the alcchol to any great extent, there will always be a precipitation of crystals. The solubility of gas in the brine amounts to almost nothing.

MR. FENNEL: I notice, in this experiment, that there is a deposition of iodine. In your experience has this always occurred?

MR. CURTMAN: Yes; unless you use a great surplus of iodide of potassium solution. You could just as well add twenty cubic centimetres, or even more; but you would then, during the experiment, have to empty a part of the equilibrium tube.

MR. FENNEL: It does not vitiate the results?

MR. CURTMAN: Not at all. The iodine dissolves in the amyl-alcohol or in the iodide of potassium, and it might do to add in a little more solution of the latter, taking twenty cubic centimetres, for instance. I have suggested ten, because that gives always an exact difference in specific gravity of the two liquids; but you can take more and calculate for the greater quantity just as well. If you use much more, however, you will have the trouble of partly emptying the tube.

MR. PATCH: Cannot the amount of gas evolved by the acidity of the sample be used as a correction to show the true amount of amyl-nitrite? For instance, this sample has changed, some nitrous acid has been formed, and that evolves gas before the addition of the sulphuric acid. Can that be used in any way to show the true amount of amyl-nitrite?

MR. CURTMAN: I am afraid not, because the acid is the cause of the decomposition of the amyl-nitrite and potassium iodide, and it matters not whether it was present in the sample or added afterwards; for the same volume of gas will be liberated in either case, corresponding to the unchanged nitrite, if there be sufficient acid to decompose all of it.

MR. PATCH: Could not the first evolution of gas from the mixture of potassium iodide and amyl-nitrite be used to determine how much the sample had lost by decomposition?

MR. CURTMAN: No; for between the first product of decomposition and the final change into acid, there are transition changes, especially valerianic aldehyd, which may be produced at different intervals of time, and you cannot tell at what interval you have arrived. It will not give an accurate measure for the change. The whole decomposition is divided among the final products and the changes in the intermediate stages, and you cannot base any calculations upon that, since it is very uncertain to what stage the oxidation has gone on. If exposed for two days it will have less of acid and more of aldehyd than if it has been exposed to air for a longer time.

MR. PATCH: In view of that, would it be practicable to suggest the employment of bicarbonate of potassium for neutralization before starting with the assay, as stated by Mr. Thompson, who suggested the bicarbonate to rid the product of acidity during storage?

MR. CURTMAN: It would not interfere. At the same time, I do not see any advantage in it, because on agitation some of the amyl nitrite would volatilize and leave more of the less volatile products in the residue. Another trouble would be, that in saturating the acid with bicarbonate, you produce much of carbonic anhydride, which would be partially dissolved, and subsequently produce an error.

MR. PATCH: Would you undertake to make a correction for the free acid by titration or any other method?

MR. CURTMAN: That has been provided for already in the Pharmacopœia by another assay.

MR. PATCH: Would you find the amount of free acid before you begin the nitrometric assay?

MR. CURTMAN: Yes, sir. The Pharmacopœia now prescribes that. The nitrometric test I propose is only additional to the tests of the Pharmacopœia, where ammonia water is used for the purpose of neutralizing and determining the limit of the acid.

MR. PATCH: If we have a sample of either of these products, amyl nitrite or ethyl nitrite, that is changed, one might believe that all the gas evolved was due to absolute amyl nitrite or ethyl nitrite, unless this correction was made by determining the amount of free nitrous acid by a second process.

MR. CURTMAN: All the nitrous acid present is converted into NO gas, and when there is no free acid, it is liberated by the sulphuric acid we add to it. The process is initiated by any free acid present, and is completed by the addition of the normal sulphuric acid. Hence, it does not, in any way, interfere with the final result. For the determination of free acid, the simple acidimetric processes, using the ordinary indicators, would suffice.

MR. ECCLES: Wouldn't it be easier to get equilibrium there if you used more of the salt solution in your equilibrium tube?

MR. CURTMAN: The sample here used has deteriorated during transportation. I expected to get a larger amount of gas. It is the best policy to use the level of the liquid in this tube as low as you can get it during the process. On account of being under less pressure, the gas will be disengaged more rapidly, and you can afterwards fill the tube, and get the true reading by raising the equilibrium tube.

MR. ECCLES: Wasn't it in 1885 that this instrument was first introduced by Allen and others, and given to American pharmacists?

MR. CURTMAN: The instrument was introduced much before that time, by Lunge. Allen used Lunge's nitrometer, only leaving off the three-way stop-cock; but he introduced the process.

MR. ECCLES: In 1885, I made a large number of tests of sweet spirits of nitre for the United States Government from various regions, and also the concentrated products, and I have a curiosity to know whether the "M" here is a European house or an American house, because there was an American house whose concentrated article surpassed all others in the market.

MR. CURTMAN: I made the analysis of the samples from different sources for information, and not for the purpose of reflecting on any firm, for we do not know how well their specimens may have been kept, although I received them all in original packages.

MR. ECCLES: It is strange that the manufacturers have not before discovered that it decomposes in white glass. It is only lately that one or two have commenced using colored glass. This decomposition is a very serious matter for physicians, especially when trying to overcome the evil effects of chloroform. They are very much embarrassed with the doses.

MR. CURTMAN: I don't recollect having heard of any death occurring through the administration of amyl nitrite, even in large quantities, in a healthy person; but deaths have undoubtedly occurred where it was used in asthma, and where over-dosing had been done, and patients have suffered from the uncertainty of the article.

Mr. Oldberg: A question was asked by Mr. Thompson and answered by Mr. Curtman that reminds me of the practical phase of the preservation of amyl nitrite and ethyl nitrite; that is, to prevent acidity by the addition of bicarbonate of potassium. Mr. Curtman answered that it neutralizes the acid that has already been formed, which is, of course, correct. My experience is, that the presence of bicarbonate of potassium actually encourages decomposition of ethyl nitrite.

Mr. Curtman: It is very natural that it should do so, for the reason that the presence of a base hastens the formation of acid to combine with it.

Mr. Oldberg: I made the observation simply because some one might be tempted to use bicarbonate of potassium for the sole purpose of preventing the formation of acid; but it will not answer, for it simply hastens decomposition.

Mr. Curtman: It has no influence upon the nitrometric measurement in the assay process; but it is possible that $CO_2$ might mingle with the NO gas to some extent.

Mr. Martin: I notice under the letter "C" that the percentage is very great. Would you state to what you consider that high percentage due? Is it owing to the freshness of the supply?

Mr. Curtman: I used the utmost care in fractioning the fusel oil, so as to get very pure amyl alcohol, and used the process now practiced, which is superseding the old and very poor process with free nitric acid. I used sodium nitrite and sulphuric acid. That is also the reason why some firms furnish us ethyl nitrite that is entirely free from aldehyd. Nitric acid goes too far in oxidizing, and not only substitutes the alcoholic hydroxyl by $NO_2$, but also oxidizes a certain quantity of amyl alcohol into amyl nitrate and amyl valerianate. Moreover, valeric aldehyd and nitropentane are very frequently found in specimens that are made with free nitric acid, instead of with free nitrous acid generated from sodium nitrite and sulphuric acid.

Mr. Martin: About what percentage of the sodium nitrite would you think should be standard if it were to be adopted by the Pharmacopœia?

Mr. Curtman: We are getting in the trade, now, sodium nitrite of 98 per cent. from German sources.

Mr. Good moved that a vote of thanks be tendered to Mr. Curtman for his able paper, and the accompanying interesting experiments which he had performed. Mr. Oldberg seconded the motion, which was duly carried.

The following paper was read by Mr. Fennel, the author not being present:

## ECONOMIC PERCOLATION.

BY HARRY VIN ARNY.

While it is an accepted fact that the process of percolation after pharmacopœial directions is accompanied by loss through the evaporation of alcohol present in the menstruum, the extent of that loss is not appreciated until careful computation of such is made. A calculation of this nature gives evidence of loss far beyond that usually supposed, and clearly indicates the necessity of such improvements in the process as will materially lessen the waste.

With this end in view, systematic investigation has been pursued, with results given below. For this investigation no claim of rigid scientific exactitude is made, it being confined to practical operations performed in a retail pharmacy with all the care possible under existing disadvantages.

The first step in the investigation was the estimation of the loss by the employment of pharmacopœial directions, obtaining the alcohol remaining in the marc by distillation and estimating it at menstruum strength. This line of experiment, which we will designate as Process No. 1, resulted as follows:

PROCESS NO. I.

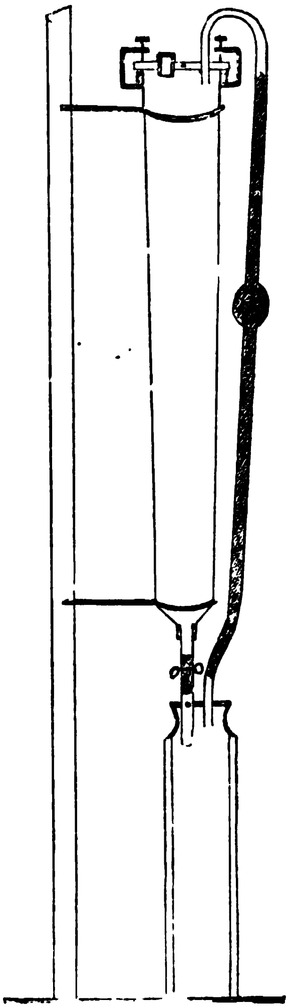
| Substance. | Quantity. | | Time of process (in days). | Percolate obtained (in fluidounces). | Distillate obtained (in fluidounces). | Menstruum employed (in fluidounces). | Loss (in fluidounces). |
|---|---|---|---|---|---|---|---|
| Belladonna root | 6 | troy oz. | 3 | 36.5 | 7.5 | 46.000 | 2.0 |
| Buchu | 4 | " " | 3 | 17.625 | 3.25 | 24.0 | 3.125 |
| Calisaya comp. (for elixir) | 29 | av. oz. | 8 | 164.00 | 48.00 | 288.0 | 76.00 |
| Cascara | 20 | troy oz. | 8 | 127.00 | 16.5 | 158.0 | 14.5 |
| Catechu comp. (for tincture) | 6¾ | av. oz. | 5 | 32. | 3.25 | 37.0 | 1.75 |
| Cinchona comp. (for tincture). | 12 | " " | 2 | 64. | 13.333 | 109.0 | 31.66 |
| Cubeb | 3 | " " | 2 | 32. | 2.000 | 35.5 | 1.5 |
| Digitalis | 2½ | " " | 5 | 16. | 2.00 | 21.0 | 3.0 |
| Gentian comp. (for tincture) | 8 | " " | 4 | 58.5 | 8.00 | 74.5 | 8.0 |
| Horehound | 8 | troy oz. | 5 | 51.0 | 6.25 | 65.5 | 8.25 |
| " | 8 | " " | 3 | 54.0 | 5.5 | 70.0 | 10.5 |
| " | 8 | " " | 6 | 48.0 | 9.25 | 64.5 | 7.25 |
| Jaborandi | 7½ | " " | 7 | 51.0 | 4.00 | 65.0 | 10.0 |
| Red cinchona | 4 | " " | 8 | 20.75 | 3.00 | 28.0 | 4.25 |
| Rhubarb | 4 | " " | 4 | 24.75 | 4.00 | 32.0 | 3.25 |
| Sarsaparilla | 8 | " " | 4 | 49.0 | 7.25 | 66.0 | 9.75 |
| " | 8 | " " | 5 | 50.5 | 7.5 | 70.5 | 12.5 |
| " comp. (for syrup). | 9 | av. oz. | 5 | 24.0 | 1.0 | 36.0 | 11.0 |
| Senega | 7 | troy oz. | 9 | 47.0 | 5.667 | 61.0 | 8.34 |
| Valerian | 8 | " " | 5 | 49.0 | 3.5 | 59.0 | 6.5 |
| " | 4 | " " | 3 | 24.5 | 3.0 | 30.0 | 2.5 |
| " | 4 | " " | 5 | 25.0 | 3.75 | 32.0 | 3.25 |
| Totals | | | | 1066.125 | 167.50 | 1472.5 | 238.875 |

Average time of process, 5 days. Percentage of loss, 16.2.

By this method evaporation may occur both from the menstruum in the percolator and the percolate in the receiver, and to attempt to close either vessel sufficiently tight to prevent evaporation hinders the progress of percolation by retarding the circulation of air. To obviate this difficulty a modification of the volatile liquid percolator was adopted—the apparatus (see Fig. 1), consisting of a glass percolator of the "Oldberg" pattern, for which was provided a brass cover containing two orifices, one for the ingress of menstruum, the other for the entrance of air. The former hole was tightly closed by means of a screw cap fitted with a rubber washer, while from the latter proceeded a U-shaped brass tube, to which

was attached a rubber tube of sufficient length to reach down to the receiver. The cover was tightly fitted to the percolator by means of iron clamps, a rubber washer completing the fitting, while the projecting glass rim of the percolator was fortified by a wooden ring placed beneath.

FIG. 1.



Volatile Liquid Percolator.

As a receiver a tall museum jar was utilized. Two holes were made in its cover and were fitted with corks, through each of which passed a piece of glass tubing. Over one of these tubes was slipped the rubber tube from the brass cover mentioned before, while to the other was attached a short

rubber tube, the upper end of which was fitted by means of a glass tube and cork to the neck of the percolator.

Percolation in this apparatus (which we will term process 2, and in which, as in process 1, the alcohol in the marc was recovered by distillation) was effected with economy, as is shown by the following table:

PROCESS NO. 2.

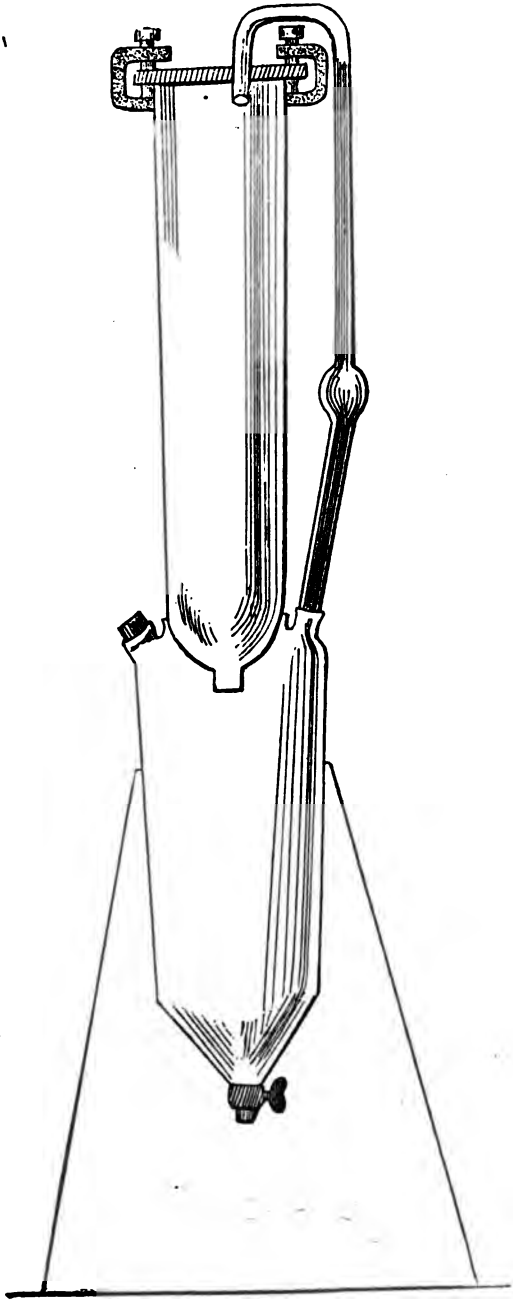
| Substance. | Quantity. | | Time of process (in days). | Percolate obtained (in fluidounces). | Distillate obtained (in fluidounces). | Menstruum employed (in fluidounces). | Loss (in fluidounces). |
|---|---|---|---|---|---|---|---|
| Belladonna root | 6 | troy oz. | 4 | 43.5 | 7. | 51.5 | 1.0 |
| Buchu | 4 | " " | 4 | 20.25 | 3.625 | 27.0 | 3.125 |
| Calisaya comp. (for elixir) | 30 | av. oz. | 28 | 160.0 | 33.0 | 196.0 | 3.0 |
| Cascara | 20 | troy oz. | 6 | 126.0 | 13.333 | 138.0 | +1.333 |
| Catechu comp. (for tincture) | 6¾ | av. oz. | 8 | 32.5 | 2.375 | 36.0 | 1.125 |
| Cinchona comp. (for tincture) | 12 | " " | 2 | 64.0 | 10.0 | 85.0 | 11.000 |
| Cubeb | 3 | " " | 2 | 32.0 | 3.0 | 35.0 | 0.0 |
| Digitalis | 2½ | " " | 3 | 16.0 | 3.75 | 20.0 | 0.25 |
| Gentian comp. (for tincture) | 8 | " " | 4 | 59.5 | 8.75 | 68.0 | +0.25 |
| Horehound | 8 | troy oz. | 5 | 56.5 | 7.75 | 70.5 | 6.25 |
| " | 8 | " " | 4 | 51.0 | 7.75 | 64.0 | 5.25 |
| " | 8 | " " | 6 | 51.0 | 7.75 | 65.0 | 6.25 |
| Jaborandi | 7½ | " " | 6 | 49.5 | 8.5 | 63.0 | 5.0 |
| Red cinchona | 4 | " " | 7 | 20.5 | 2.25 | 26.0 | 3.25 |
| Rhubarb | 4 | " " | 4 | 25.5 | 2.25 | 31.5 | 3.75 |
| Sarsaparilla | 8 | " " | 9 | 51.0 | 12.5 | 64.75 | 1.25 |
| " | 8 | " " | 7 | 45.75 | 7.5 | 60.00 | 6.75 |
| " comp. (for syrup) | 9 | av. oz. | 5 | 23.5 | 3.5 | 36.00 | 9.00 |
| Senega | 7 | troy oz. | 6 | 42.25 | 6.5 | 53. | 4.25 |
| Valerian | 8 | " " | 3 | 47.5 | 5.5 | 56. | 3.0 |
| " | 4 | " " | 4 | 23. | 2.333 | 27. | 1.667 |
| " | 4 | " " | 3 | 24. | 2.75 | 28. | 1.25 |
| | | | | 1064.75 | 161.666 | 1301.25 | −76.417 |
| | | | | | | | + 1.583 |
| | | | | | | | 74.834 |

Average time of process, 5.9 days. Percentage of loss, 5.7.

In two preparations mentioned in this table the process was performed with gain instead of loss, to wit: Cascara, where the percolate and distillate was 1⅓ fluidounces more than the menstruum employed, and gentian compound, where the gain was ¼ fluidounce. At first glance this condition seems impossible, but it will be readily understood when it is stated that the quantity of cascara employed contained from 4 to 5 troy ounces, and the gentian compound from 1½ to 2 troy ounces of soluble matter.

To avoid the trouble attendant upon the distillation of the marc, an attempt was made to extract the alcohol remaining therein by pumping air by means of an atomizer bulb connected to the detached lower end of the rubber air-tube of the apparatus used in process No. 2, into the space between the percolator cover and the marc.

FIG. 2.



**Compact Percolator.**

Even if this process (which we will call No. 3) should have proved an

PROCESS NO. 3.

| Substance. | Quantity. | Time of process (in days). | Percolate obtained (in fluidounces). | Menstruum employed (in fluidounces). | Loss (in fluidounces). |
|---|---|---|---|---|---|
| Belladonna root. | 6 troy oz. | 5 | 39. | 46. | 7. |
| Buchu | 4 " " | 6 | 18.625 | 24. | 5.375 |
| Calisaya comp. (for elixir) | 29 av. oz. | 19 | 162. | 210. | 48.0 |
| Cascara | 20 troy oz. | 8 | 105.5 | 132. | 26.5 |
| Catechu comp. (for tincture) | 6¾ av. oz. | 3 | 32. | 33.5 | 1.5 |
| Cinchona comp. (for tincture) | 12 " " | 2 | 67.75 | 77.0 | 9.25 |
| Cubeb | 3 " " | 2 | 32. | 35. | 3. |
| Digitalis | 2½ " " | 2 | 16. | 18.5 | 2.5 |
| Gentian comp. (for tincture) | 8 " " | 3 | 61.75 | 71.0 | 9.25 |
| Horehound | 8 troy oz. | 3 | 46. | 57.5 | 11.5 |
| " | 8 " " | 6 | 46. | 58.0 | 12. |
| " | 8 " " | 6 | 50.5 | 62.25 | 11.75 |
| Jaborandi | 7½ " " | 5 | 48.5 | 59.5 | 11.0 |
| Red cinchona | 4 " " | 7 | 18.5 | 24. | 5.5 |
| Rhubarb | 4 " " | 9 | 23.0 | 28. | 5. |
| Sarsaparilla | 8 " " | 3 | 48. | 64. | 16. |
| " | 8 " " | 9 | 51. | 64. | 13. |
| " comp. (for syrup) | 9 av. oz. | 6 | 24. | 33. | 9. |
| Senega | 8 troy oz. | 7 | 45. | 54. | 9.5 |
| Valerian | 8 " " | 4 | 45. | 52. | 7. |
| " | 4 " " | 4 | 27.125 | 31. | 3.875 |
| " | 4 " " | 5 | 25. | 31. | 6.0 |
| | | | 1032.250 | 1265.75 | 233.500 |

Average time of process, 5.6 days. Percentage of loss, 18.4.

economic success, it will never have found favor, because of the tedium and exertion of continued hand pressure on the bulb, and, as the following table shows a loss far greater than either process mentioned before, it merits nothing more than passing notice.

Another effort was made to effect the extraction of the alcohol in the marc by replacing the plain rubber tube by a syringe minus its fittings, thus producing the double effect of pressure above the marc, and rarification of air in the receiver.

This, however, proved to be a process even more tedious than No. 3; for, if all parts of the apparatus are tight, the bulb, when compressed, draws in the rarified air with a slowness that taxes one's patience severely. Moreover, it is not an economic success, for in fifteen experiments the mean loss was 17.8 per cent.

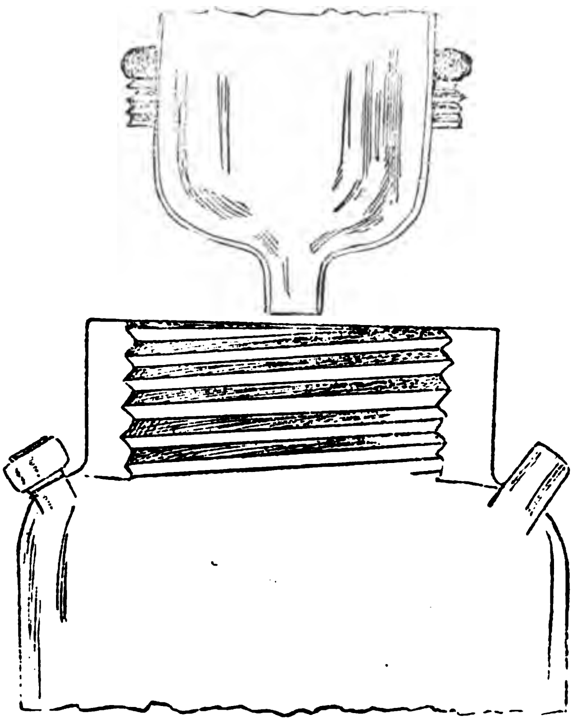
The modification has proved useful in causing and maintaining a flow of percolate, and for this purpose has been retained in process No. 2.

During the employment of process No. 2, the crude apparatus, which

was originally used, passed through series of improvements, until at the conclusion of the experiments it had evolved as the compact percolator here represented. (See Fig. 2.)

It consists of two portions:—the narrow percolator, with brass cover, as employed in process No. 2, and the slightly wider receiver, supported on a tripod with tapering bottom terminating with a straight faucet. The two parts are fastened together by a screw-joint (Fig. 3), one portion of which

FIG. 3.



Screw-joint of Percolator and Receiver.

is soldered to the base of the percolator, the other to the top of the receiver—the joint being tightened by means of tow. From the upper portion of the receiver emerges a tube, which is connected to the percolator cover by means of a syringe bulb and tubing; an additional orifice, in the same location, with screw cap, would be useful in permitting access of air when the percolate is drawn off.

The arrangement for drawing off the percolate at the lowest point in the receiver will be found most convenient in fractional percolation, as the percolate arranges itself into layers according to specific gravity, and need not be separated into fractions until the process is concluded.

The percolator and receiver now in use are constructed of tinned iron—the chief objection to which is its opacity. The effects of this, so far as the receiver is concerned, may be overcome by the employment of a glass gauge. But, if practicable, the use of a glass apparatus would be far preferable.

Being constructed in conformance with the same principles as the original form, there is no doubt as to the economic success of this apparatus, and, with its additional compactness and simplicity, it will be found a most desirable addition to the laboratory.

Thus it will be seen that the employment of cautionary measures in alcoholic percolation is as advantageous as in the percolation of more volatile liquids; for the preceding figures show that while the average loss by the employment of the officinal method was 16.2 per cent., the mean loss by process No. 2 was but 5.7 per cent.—nearly one-third. Considering the vast amount of alcoholic percolation practiced in this country, methods of reducing waste in the operation are certainly worthy of more attention than has been heretofore bestowed upon the subject, and it is therefore hoped that this paper may be the introduction to a thorough investigation of that phase of percolation which most nearly affects all practical pharmacists—the economic side.

*New Orleans, May 5, 1892.*

MR. FENNEL: I would ask Professor Patch whether the statement made by the writer is correct, namely, that in two preparations mentioned, the process was performed with gain instead of loss, to wit: cascara, where the percolate and distillate was 1⅓ fluid ounces more than the menstruum employed, and gentian compound, where the gain was ¼ fluid ounce."

MR. PATCH: I have not followed the reading of the paper carefully, and would prefer not to express an opinion on this matter until I have examined it properly. We know this: we may percolate a drug with alcohol, and then estimate the alcohol afterwards, and get a stronger alcohol in the percolate than we used on the drug itself in extracting the drug, owing to the abstraction of water from the alcohol by the drug. We may get a weaker product, caused by the amount of moisture in the drug, and we have learned that in drugs like dandelion, for instance, the difference between specimens stored in a damp or dry situation and used for percolation may make a difference of five or ten per cent. in the alcoholic strength of the product, and may make a corresponding difference in the extractive strength.

MR. MAISCH: That is not mentioned in the paper; the author calculates the distillate by fluid ounces, after estimating its alcoholic strength and adds this to the percolate measured in fluid ounces; and he claims that there has been a loss in every case except two. The loss is due to the retention of some alcohol by the drugs, and the large amount of constituents in cascara and gentian accounts for the increase instead of loss.

MR. HALLBERG: It is to be regretted that the author of the paper is not present. I desire to invite attention to the fact that here is an evidence of the advantages of the metric system. If the quantities expressed in these various tabular exhibits had been rendered in the metric system, the entire work would have been more intelligently appreciated by this Section.

MR. ALPERS: Noticing the statement which Mr. Fennel referred to, it struck me that there must be a mistake somewhere. The quantity of cascara used for percolate for this experiment is given as 20 troy ounces, and on the next page the author states that this contained from 4 to 5 troy ounces of soluble matter. Now, I do not doubt that everyone here present will be surprised at this statement, that the cascara contained 25 per cent. of its weight of soluble matter, and thus increased the percolate. I have never been able to get that quality of cascara.

MR. HALLBERG: The percentage of extract of cascara sagrada varies greatly, of course, with the percentage of alcohol in the menstruum, but particularly with the quality of the drug. With medium cascara sagrada from 20 to 25 per cent. of extract is always obtained with alcohol varying from 50 to 55 per cent. It is not at all unusual to obtain that percentage of extract.

MR. REMINGTON: The subjects which have just been brought up here are very important in their general bearing. The yield of extract is rarely considered sufficiently by the pharmacists of the country. In a series of experiments I have just concluded for the Pharmacopœial Committee (and the matter has been progressing now for over a year) I have found that even a difference of 2 or 3 per cent. in the strength of alcohol used in the menstruum will sometimes work more than a difference of 5 or 6 per cent. in the yield of extract. And this has been more trouble to me than anything else in this department of pharmaceutical work. We frequently see in the pharmaceutical journals statements made by those who have weighed the amount of extracted matter in drugs, and have found differences from published results; they ignore the very important, though what to them appears most insignificant fact, that they have not taken the specific gravity of the alcohol accurately. In the first place, they did not know exactly what the specific gravity of the menstruum was that they employed, and they did not compare it accurately with the specific gravity laid down in the Pharmacopœia, and that accounts for the many differences that we find. This is especially true of nux vomica and other drugs which are extracted. I agree with the Chairman's statement, that it is not at all unusual for cascara sagrada to yield 25 per cent. of extract, and that can be increased by a more aqueous menstruum. As a usual thing, the yields of extracts are increased with a proportion of water. There are exceptions to this, and one is valerian, where the alcohol produces a larger yield.

Another point is the question which has been brought up by Mr. Arny, who has given much attention to this matter, and in many respects has presented some important facts, and that is the usefulness of these problems in percolation and the value of working them out. It shows, in connection with the paper and the discussions which have arisen here, that the druggists of the country are now working out these problems in percolation for themselves, and beginning to learn more about the various processes of percolation. One of the most encouraging facts in connection with the elevation of pharmacy, I take it, is this work that is going on now, and which is being undertaken not by the few men whom we used to hear from on percolation—Squibb, Graham and Procter—but by men in various parts of the country. Among these is Mr. Hurty, who has gone largely into the study of percolation. And the more we study the processes of percolation and know the results, the more are we likely to become interested in the subject and make preparations for ourselves..

One other point brought up here, which I wish to speak about, is the question of the amount of extract which is obtainable from drugs. Mr. Patch referred to it, and it is a most important matter. The Pharmacopœia takes no account of the amount of moisture in a drug, and when we are working for accurate results you have to work with air-dry drugs. Some drugs contain 20 per cent. of water, and the pharmacist often does not

know that it contains that much. A great deal of the difficulty experienced in the use of menstruum is due to the fact that while one druggist is working with a drug filled with moisture, another works with one kept in a dry place, and occasionally it is sufficient to alter to some extent (particularly in fluid extracts), the relative proportion of water in the menstruum. Unfortunately, we cannot all work with air-dry drugs, and when this question of standardization comes up, that is a fact to be considered. Unless we do work with air-dry drugs from which the moisture is extracted, we cannot expect uniform results.

MR. PATCH: This matter is certainly an important one. The temperature is quite as inportant. Any series of experiments like this have little value unless temperature is alike, and the temperature depends upon the mass of the drug. If we have a large percolator, filled with a large quantity of drug, and there is a change of temperature, the interior of the mass does not feel it as much as the outside. It takes longer for an equilibrium to be established, and the rate of extraction on the outside of that mass, and the inside, is different. Then again, aside from that, there is a great variation in the drugs themselves. We have kept a careful record of many lots of ergot, and have found a variation in the material, using the same menstruum, of from 14 to 22 per cent. of extracted matter. With butternut we have a variation of from 14 to 28 per cent. Thus we are led to believe that the only value that can be attached to all work of this kind is by taking data established by different men with different lots of drugs, with the moisture estimated, and the temperature carefully considered, and when we have done all that, we simply know that there is a variation.

MR. MAISCH: It is well that attention has been called to the presence of moisture in drugs, but the term used by Mr. Remington, I think, was hardly intended by him. He spoke of air-dry drugs. Now, pharmacists use air-dry drugs. I suppose he had reference to drugs dried at an elevated temperature in dry air.

MR. REMINGTON: Yes; warm air.

MR. MAISCH: I understood what you meant, only I thought it would be well to call attention to it. The importance of this subject was very well illustrated by a paper which Mr. Kennedy presented to the Association a number of years ago, in which he determined the amount of moisture that was present, at ordinary temperatures, and at different times during the year, in powdered drugs which he had prepared himself.

Coming back, however, to the paper before us, it strikes me that there should be no surprise manifested at the fact that in two cases there was an apparent excess of liquid obtained. The first table in this paper indicates the loss obtained in the ordinary process employed by the Pharmacopœia. Mr. Arny has, I take it, percolated the article with a certain amount of menstruum, in an open percolator, or one which was not hermetically closed. The drug left in the percolator was subsequently subjected to distillation to recover the alcohol, and the alcohol reduced to the strength of the original menstruum; the loss which is indicated there is actually due to the loss of alcohol by evaporation, and to alcohol which is mechanically retained in the marc. Now, in that second process you will find that he used a percolator that was hermetically sealed. Theoretically, he should have obtained an excess in liquid in every instance, because the amount of the extract which is taken up by the menstruum occupies a certain space. It increases the amount of liquid apparently. The marc which was left in this hermetically sealed percolator was subsequently submitted to distillation, the alcohol reduced to the strength of the original menstruum used, and the two together, that is, the percolate and this distillate from the marc together, should produce the original amount of liquid plus a certain amount of space that is occupied by the extract. Practically, a loss has occurred in every instance, with the exception of these two; and that loss, to my mind, is mainly due to the mechanical retention of the alcohol. Probably, if Mr. Arny had car-

ned on his distillation for a longer period and under different circumstances, he would have finally obtained a larger amount. Where there is a large amount of 'extractive matter, as in the case of cascara sagrada, frangula, gentian, taraxacum, etc., one will be very apt, under these circumstances, it seems to me, to get a surplus of liquid over and above the menstruum originally employed. The most remarkable feature of the whole matter, however, is not the excess, but the loss in fluid ounces. It seems to me that there is a defect in the two tables, in that the time is not the same, neither are the quantities always the same that were used. There cannot therefore be a correct conclusion or an absolutely fair comparison. But the large amount of loss from some of the drugs extracted in hermetically sealed percolators is rather remarkable.

MR. HALLBERG: According to my experience, it is impossible to obtain the whole amount of alcohol from a drug by simple distillation; it is necessary to add to it water or live steam. The drug, in proportion to the aqueousness of its texture, retains an amount of alcohol, which cannot be dislodged except by boiling water or steam permeating through it, which volatilizes the alcohol along with it.

MR. MAISCH: A difficulty that is found in the use of live steam for recovering all the alcohol, at least when working with large quantities, is that you have to obtain an enormous quantity of distillate to vaporize the alcohol retained by the marc.

The author not being present at the meeting, the following paper was read by Mr. Whelpley:

## SEPARATION OF STRYCHNINE AND BRUCINE.

BY H. W. SNOW, PH. C.

At a meeting of the Michigan State Pharmaceutical Association in October, 1890, I presented a paper on the above subject,* in which I passed in review various processes that had been suggested for the separation and quantitative estimation of these two alkaloids.

Among the methods tried were Dunstan & Short's ferrocyanide scheme, Schweissinger's indirect method by titration with standard $\frac{N}{100}$ acid, Dragendorff's indirect estimation by titration with Mayer's reagent, Lyons' gravimetric method by weighing the precipitate with Mayer's reagent, Prescott's attempt to separate the two alkaloids by using an alcohol of 20.6 per cent. at a temperature of 20° C., as well as two schemes of my own suggestion, in which it was attempted to make an indirect estimation of them by estimating the chlorine in the mixed chlorides, following the well known indirect process of estimating potassium and sodium in mixture. In all of these cases I could only report failure, and as the results have already been given in full, together with a short bibliography of the subject, I propose in this paper to take up the work at the point where it was dropped, and give the results of some further experiments.

It is well known that phenolphthalein is not affected by alkaloids, with the exception of atropine. Based on this fact an indirect method was tried,

* Proceedings Mich. State Assoc., Sept. 1889, 73; Western Drug., 1889, 438; Amer. Drug., 1889, 202.

in which it was proposed to estimate the chlorine combined with the bases somewhat as follows:

A known weight of the alkaloids was dissolved in chloroform, and a chloroformic solution of hydrochloric acid was added. Upon careful evaporation, followed by two or three subsequent solutions in chloroform and evaporations, the pure chlorides, free from excess of hydrochloric acid, were obtained. The chlorides so obtained can then be dissolved in water, phenolphthalein added, and the hydrochloric acid present can be estimated as though there were no bases present. This method using $\frac{N}{25}$ soda applied to pure strychnine alone in two experiments showed as follows:

| Strychnine taken. | Strychnine estimated. |
|---|---|
| 0.205 | 0.206 |
| 0.120 | 0.118 |

With brucine alone the following results were obtained:

| Brucine taken. | Brucine estimated. |
|---|---|
| 0.201 | 0.202 |
| 0.147 | 0.146 |

These figures were very encouraging, and the process was then tried on mixtures of the two alkaloids. In all, eight experiments were tried. Five of them were discarded because it was not found possible to fix a definite end reaction. In the case of the separate alkaloids, no difficulty was experienced in fixing to a nicety the color change. The other three experiments, when calculated out, gave figures worse than useless.

A reference to my previous paper will show that this same difficulty of fixing the end reaction was experienced in other similar indirect methods. These experiments satisfy me that indirect methods cannot be expected to yield satisfactory results. Attention was next directed to the weak alcohol method suggested by Dr. Prescott. In my previous paper this method was spoken favorably of as one worthy of careful trial, and it is true that in the first experiments some very encouraging results were obtained, but subsequent developments failed to bear out this encouragement. Later a considerable number of preliminary experiments were performed, and finally 16 per cent. alcohol was taken instead of the 20 per cent. originally suggested, as it was found that brucine was easily soluble in this weaker alcohol, while the strychnine was less soluble, and it was thought to afford a better and more perfect separation.

As first applied the process was as follows: The alkaloids were dissolved by very gentle warming in 5 c.c. of 16 per cent. alcohol, in which a small portion of the water was replaced by hydrochloric acid. The solution was then cooled and enough 16 per cent. alcohol added to make a measure of 15 c.c.; solution of caustic soda in 16 per cent. alcohol was then added very cautiously to precipitate the alkaloids, and the mixture was then

cooled to 20° C. and placed in a water bath at that temperature for half an hour. The precipitated strychnine was collected on counterpoised filter papers in an apparatus arranged to keep the filtering solution at a temperature of 20° C., the alkaloid was then carefully washed with 10 c.c. of 16 per cent. alcohol at regulation temperature, the filter papers pressed between blotting paper and then dried in an air bath, and the weight of the alkaloid obtained.

At another time it was tried dissolving the alkaloid by means of heat in water containing a minimum amount of hydrochloric acid, cooling and then adding water to make a definite weight, and then sufficient alcohol to bring the solution up to 16 per cent. alcohol, when the caustic soda in 16 per cent. alcohol was added to precipitate the strychnine. Although every precaution was taken to prevent change in temperature or alcoholic strength and to avoid excess of caustic soda, nevertheless work on strychnine alone showed great variations in the amount of strychnine dissolved and no satisfactory correction could be obtained. For the time being the experiments were abandoned, and it was long after before the following procedure suggested itself as a possible solution of the problem. Concluding that although the authorities stated strychnine not to be soluble in caustic alkalies, it might be possible that this would account for the variations observed, it was resolved to proceed so that the addition of an alkali should be avoided. This may be accomplished as follows:

A known weight of strychnine is placed in a 60 c.c. flask provided with a tight-fitting cork and the weight of the whole then taken. Into the flask is then introduced 10 c.c. of alcohol, the cork is inserted and the weight taken; warm gently to dissolve the alkaloids, then when cold weigh again to check against possible loss of alcohol. In practice it was found that the loss rarely exceeded two or three milligrammes, and in no case was it found to be great enough to take into consideration. When cold add 38.4 c.c. of water, this being sufficient to make 16 per cent. alcohol, weigh and allow to stand three or four hours, then cool to 20° C. and keep there for half an hour. Carefully decant as closely as possible from the precipitated strychnine and again weigh. From the decantate, after dilution with water, shake out the alkaloid with chloroform, evaporate and weigh. Applied to pure strychnine the alkaloid was found in seven trials to have a solubility as follows:

| | |
|---|---|
| 1 in | 3285 |
| 1 in | 2942 |
| 1 in | 3034 |
| 1 in | 3048 |
| 1 in | 3155 |
| 1 in | 3270 |
| Average=1 in | 3122 |

The results with strychnine being found satisfactory, the process was

applied to a mixture of strychnine and brucine, using 1 in 3100 as the correction for solubility of strychnine:

| | Took of Strychnine. | Took of Brucine. | After correction for solubility of Strychnine. | |
|---|---|---|---|---|
| | | | Obtained of Strychnine. | Obtained of Brucine. |
| 1st Experiment .... | 0.1868 | 0.0757 | 0.1805 | 0.082 |
| 2d " .... | 0.072 | 0.1747 | 0.0292 | 0.218 |
| 3d " ... | 0.114 | 0.1095 | 0.0915 | 0.132 |

It will be seen from these experiments that the presence of brucine influences the solubility of the strychnine, and that the greater the proportion of brucine the greater the solubility of the strychnine was found to be. This is a familiar fact, and is best seen in the influence of quinine over the solubility of cinchonidine in ether. The results were such as to discourage further work in this direction, and, while not being exhaustive, they are sufficient to indicate the probable failure of this means of separation. Gerock,* in connection with some experiments on strychnine and brucine, noticed the fact that strychnine resisted the action of dilute nitric acid much more persistently than did brucine, and, after long experimenting, announced that nitric acid of sp. gr. 1.056 would decompose brucine on warming, but that it would not affect strychnine. No details were given as to time and temperature, and it is obvious that these are essential to the successful application of such a method. The method does not, at first sight, strike one favorably, but all others having failed, it was decided to try a few experiments with it. Three portions of brucine were treated each with five c.c. of nitric acid sp. gr. 1.056 successively for fifteen, thirty and forty-five minutes at 90° C., at the end of which time the solution was made alkaline and then shaken out with chloroform. In every instance the alkaloid was found to be decomposed. Trials with strychnine showed that for fifteen minutes, at 90° C., a very considerable portion of the alkaloid was decomposed. As a check on the subsequent operations, it was decided to find what loss, if any, would result from shaking out strychnine from alkaline solution with chloroform. To this end 0.1502 grams of strychnine were dissolved in a little water acidulated with hydrochloric acid. The solution was then made alkaline, the alkaloid extracted by chloroform, and on evaporation and weighing 0.1514 grams of alkaloid were obtained, showing virtually no loss. The two alkaloids were then tried in a stoppered flask in a water-bath, carefully regulated by a thermo-regulator at a series of graded temperatures as follows, the time being for each fifteen minutes for each temperature;

* Amer. Drugg., 1889, 91, from Archiv der Pharm., 1889, 158; also in Amer. Jour. Phar., 1889, 180, and Proc. Amer. Phar. Assoc., 1889, 702.

| | Temperature. | Taken. | Obtained. |
|---|---|---|---|
| Strychnine | 80° C. | 0.1313 | 0.1234 |
| Brucine | 80° C. | 0.127 | 0.000 |
| Brucine | 70° C. | 0.1022 | 0.0008 |
| Brucine | 60° C. | 0.1028 | 0.0018 |
| Strychnine | 60° C. | 0.1072 | 0.0846 |

In the case of brucine a body is formed that precipitates Mayer's reagent, whereas with strychnine the colored product formed by the action of the acid causes no precipitate with Mayer's reagent or other general alkaloidal tests. These experiments indicate that while there is considerable difference between the alkaloids in their resistance to acid of 1.056 sp. gr., it is still very doubtful whether this can be applied for their estimation when in mixture.

Altogether this subject is a most discouraging one, and though I have performed many experiments, have as yet nothing but negative results to offer.

MR. CASPARI: I am surprised at the remarks quoted from Dr. Gerock, who has long been the valued assistant of Professor Flückiger, of Strassburg, who published this process in detail in the "Archiv der Pharmacie" some years ago, and the "American Druggist" published a short abstract of it. It seems, unfortunately, that Mr. Snow did not get the process in detail. It was published in the Pharmaceutical Review for May, if I remember rightly. The process developed results which show that it is entirely satisfactory, not only with mixtures of pure alkaloids, but in treating the alkaloidal residue extracted from nux vomica extract. The method of treating brucine with warm dilute nitric acid is an old one, and I think gave rise to some very unpleasant discussions between Baron Liebig and his contemporaries—so much so, that they finally agreed to give to the new product formed the name of "the bad-smelling acid," on account of the very bad feeling it had produced between the scientists. If we look at the figures on the last page, we see clearly that the application of warm dilute nitric acid is destructive to brucine. In the first table, nothing was obtained from 127 milligrammes; in the second, only 0.0008 was obtained from 0.1028, and in the third, 0.0846 from 0.1072. Now, if the process is carried out with the free alkaloids, the brucine would be eliminated, and the difference in weight between the total alkaloids and the strychnine is ascertained. The temperature used by Mr. Snow was probably too high, however. It was 40°, if I remember, when employed by Dr. Gerock. The ferro-cyanide method has proven a failure in the hands of many, and I think all analysts have been seeking for a process to effectually separate brucine and strychnine in the estimation of alkaloids of nux vomica; thus far Gerock's method is the only one that gives results which we can utilize. It is unfortunate that Mr. Snow did not get that article in detail; for then, I am sure, his report would have been more complete, and I think more valuable. I know, from a series of estimations made under Dr. Gerock's eye, using weighed quantities of strychnine and brucine, that the process was a perfect success, and afterwards, when applied to the alkaloidal residues, proved equally efficacious.

MR. LLOYD: In the separation of these two alkaloids I have had no experience, but some years ago there was a query before our Association which asked whether brucine was poisonous or not. Some physiological investigators have made a statement that it is. Professor Bartholow, of Philadelphia, agreed to investigate the subject, and in order that he might have a specimen of pure brucine, I attempted to make it for him. The brucine, at that time, that I bought in the market was not free from strychnine. There was some in it, and in order to separate this strychnine I used 10 per cent. alcohol. I took four ounces of brucine, mixed it with that weak alcohol, leaving about one-fourth undissolved. The mixture was made as rapidly as possible, the solution filtered and evaporated to dryness. This was then again repeated in the same manner with the 10 per cent. alcohol, and as a final result I obtained something less than an ounce of a substance which I considered true brucine. I sent it to Professor Prescott, of Ann Arbor, to test it, who said that, by the strictest tests he could apply, there was no strychnine in it. This was sent to Professor Bartholow to make his investigations with. Unfortunately, he did not complete them, although they were continued for a certain time. He intended to send his paper to the Association some years ago, but it was never presented. By this method, part of the substance can be obtained as pure brucine, but the remainder is a mixture of brucine and strychnine.

MR. RUSBY: Referring to the poisonous nature of brucine, I would call attention to the fact that Professor David Hooper, of India, had brought to his attention cases of poisoning in man and domestic animals that had occurred from eating certain leaves containing brucine, but no trace of strychnine.

MR. MAISCH: Brucine is poisonous, and I believe there is no question about that. That fact was established a number of years ago by Falck and others; but the point is this, that it is much weaker in its action than strychnine. If I remember correctly, Falck stated that the lethal dose of brucine was 38 times greater than that of strychnine. The fact that brucine, even when purified as it is found in the market, contains traces at least of strychnine, was illustrated in a very curious manner some years ago. Brucine may be purified by re-crystallization to such an extent that it does not indicate the presence of strychnine by such delicate tests like sulphuric acid and bichromate; but on destroying the brucine by means of nitric acid, the strychnine, showing greater resistance, will be left behind, and then the test can be applied. So high an authority as Sonnenschein, who had worked a great deal in alkaloids, announced on one occasion the conversion of brucine into strychnine by means of nitric acid. It was afterwards shown to be incorrect; strychnine existed in the alkaloid, and by the use of nitric acid he had destroyed the brucine and left the strychnine behind. The particular value of this paper, I think, consists in its criticisms. The process may not have been fully applied, but it goes to show the extreme difficulty of estimating correctly the amount of the most important alkaloid in nux vomica and analogous drugs, containing strychnine, brucine and probably other alkaloids.

Mr. Conrath read the following paper:

## AROMATIC SPIRIT OF AMMONIA.*

BY ADAM CONRATH.

The pharmacopœia directs that the aromatic spirit of ammonia be made by adding the solution of the commercial carbonate of ammonium in water and ammonium hydrate to the alcoholic solution of the oils, and then to filter. It does not state that the solution be allowed sufficient time to convert the salt into a monocarbonate, so it might be supposed that with the solution the conversion was complete. When the operation is performed at ordinary temperature (70° F.) this does not appear to be the case however, for when the solution, as soon as made, is added to the alcohol, a copious precipitate occurs, which re-dissolves in the course of many hours.

It appears that the framers of the official formula, for some reason or other, did not meet with this precipitation, or they would have allowed a certain time for resolution before directing the preparation to be filtered.

The result of a number of experiments made appears to indicate that about three hours are sufficient, at ordinary temperature, for a complete conversion of the commercial salt into the monocarbonate; for, when the solution is allowed to stand that long, no immediate precipitate of bicarbonate is produced, or the amount is reduced to a minimum, when the same is added to the alcohol.

The commercial carbonate of ammonium and the water of ammonia used in the experiments, of which the following shall be here enumerated, met the requirements of the pharmacopœia: The alcohol was of 94 per cent. The experiments were made at the temperature of the room, about 70° F.

No. 1. The solution of the carbonate of ammonium in water and $NH_3$ was added to the alcohol as soon as made; a copious precipitate occurred. After standing twenty-four hours, shaking occasionally, a small portion of the precipitate remained undissolved; no more of this dissolved when the time was prolonged.

No. 2. The solution of the carbonate, as under No. 1, was allowed to stand three hours and then gradually added to the alcohol and the whole mixed by rotating the bottle. No precipitate was observable at first, but on close inspection minute crystals were seen floating in the liquid after a few moments. After standing twenty four hours, precipitation, or probably better crystallization, was complete, the crystals adhering to the bottle. The quantity of bicarbonate thus crystallizing was practically the same as the quantity remaining undissolved under number one.

No. 3. The solution of the bicarbonate was added to the alcohol after

* Answer to Query No. 34. It has been reported that the precipitation in aromatic spirit of ammonia as prepared after the present official process can be prevented by permitting the solution of ammonium carbonate and ammonium hydrate in water, to stand for some time before the alcoholic solution of the oils is added.

standing twenty-four hours, and after ten days with the same result as under number two.

No. 4. The ammonium carbonate in fragments was dissolved in the prescribed amount of 10 per cent. water of ammonia, which took about three hours, then the water and alcohol were added, the result being the same as under number two.

No. 5. In making the solution of the carbonate the amount of water of ammonia was increased 25 per cent. and the water reduced correspondingly. This solution, added to the alcohol as soon as made, resulted as number one.

No. 6. The solution as under number five, after standing three hours, and then mixing with the alcohol, resulted as number two.

No. 7. Stronger water of ammonia was used in place of the 10 per cent. When added to the alcohol, precipitation occurred which completely redissolved in a couple of hours.

No. 8. Solution as under number seven allowed to stand three hours, and then added to the alcohol, no precipitation whatever occurred.

From the results thus obtained it seems preferable to allow the aqueous solution to stand some time before adding the alcohol, the conversion of the salt thus certainly proceeds more rapidly than after being precipitated.

In the course of the experiments one-half dozen different samples of commercial carbonate were used, but no complete solution could be obtained with any. The insoluble portion was reduced to a minimum, however, with a lot that was picked out of a cask opened for the purpose. When alcohol of 92 per cent. was used with this specimen, the precipitate that first formed was completely redissolved, and when the solution was allowed to stand three hours, before adding the alcohol, no precipitate formed.

The commerical carbonate of ammonium, when recently prepared may probably furnish a preparation in which the precipitate will completely redissolve when made according to the pharmacopœia, or in which no precipitation will occur if time for the conversion of the salt be permitted before adding the alcohol, but, with the article we generally meet with in commerce, incomplete solution is likely to be the rule.

Experiments were also made with the bicarbonate of ammonium—which was obtained by precipitating the commercial carbonate with alcohol—which led to the belief that the same could with advantage be substituted for the commercial salt.

If the aromatic spirit of ammonia is to be continued in the next revision of the pharmacopœia, a change in the present formula seems desirable in the interest of uniformity of the strength of the preparation.

As a prime article of the commercial carbonate is not always accessible to every pharmacist, the advisability of substituting the more staple bicarbonate, in devising a new formula, might be taken into consideration.

*Milwaukee, Wis., June 1, 1892.*

MR. RYAN: I can endorse the substance of the paper by my own experience during the last two or three years, in which I have been trying the process recommended, and know that the points are well taken. It is an excellent process.

MR. CASPARI: It seems to me that the experience Mr. Conrath has had may be explained possibly without much difficulty. The ammonium carbonate remaining in contact with the ammonium hydroxide for some time, complete conversion into the monocarbonate is insured, while the precipitation upon the immediate addition of alcohol is due to the conversion of the ammonium carbonate into a bicarbonate, I believe, but if the ammonium hydroxide be left in contact with the ammonium carbonate, until the conversion into monocarbonate is completed, no precipitation occurs when alcohol is finally added. That is the view generally held by chemists, I believe. The conversion into monocarbonate takes place during the contact of 32 hours.

MR. HALLBERG: I think the difficulty is, that in the Pharmacopœia, no provision is made for this solution to stand; if that were inserted in the text of the Pharmacopœia the difficulties with aromatic spirit of ammonia would be done away with as far as the practical part is concerned.

MR. ALPERS: I never had any difficulty in preparing aromatic spirit of ammonia I used the process recommended by Mr. Conrath, without knowing that it ought to be done in that way. I was always in the habit of making the mixture in the morning and letting it stand until the afternoon. I cannot give any explanation as to why I did so. Another thing which I observed, and which I believe is covered by the paper, is this: I was always very particular, when taking the carbonate of ammonium out of the jar, to remove all the outer parts, and only use the solid, pure article.

MR. CURTMAN: An explanation of the difference in its behavior may be found in the fact, that our official carbonate of ammonium contains no bicarbonate of ammonium at all, but carbonate and carbamate of ammonium; and that the contact of the carbamate with water produces the change, so that we afterwards have carbonate and bicarbonate mixed; that change is not so instantaneous as it is often supposed to be. It requires some time for the re-arrangement of the molecular structure to take place. I believe, although I have not experimented, that to this may be due some portion of the difficulty that has been experienced.

MR. CONRATH: There is one fact I would call particular attention to. I have precipitated the commercial carbonate with alcohol, and then tried to dissolve it in a small quantity of water; that carbonate was decomposed by water, carbonic acid being evolved, effervescence taking place. What is formed there?

MR. KREMERS: I would suggest, as an explanation, the fact that modern chemists consider that water sometimes acts in the capacity of an acid, and when forming the solution of the carbonate it is probable that it acts in this capacity, decomposing the salt and setting free carbonic acid.

MR. CONRATH: What would be the primary result if carbonate of ammonium is mixed with water?

MR. KREMERS: The monocarbonate would result from both, setting free carbonic acid.

MR. CURTMAN: I am afraid that is hardly correct. But, if you dissolve bicarbonate of potassium or sodium in water and let it stand for some time, you get a reaction of the monocarbonate, and there is an evolution of carbonic acid. Solutions of bicarbonate do this even at a low temperature.

MR. REMINGTON: I am sure Professor Curtman is right. As to the formula for aromatic spirit of ammonia, however, I think there is another difficulty, which is that there is too much alcohol. Diminish the alcohol—that is the secret of the whole trouble.

MR. HALLBERG: The amount of alcohol ought to be reduced, most decidedly.

MR. CASPARI: The excess of alcohol does not explain the observations of Mr. Conrath, for ammonium carbonate—the official salt—remaining in contact with the ammonia for some time, is converted into the monocarbonate, which is perfectly soluble in alcohol. It may not do this immediately when added, but contact brings about the change, and that is the compound the Pharmacopœia uses.

MR. HALLBERG: A clear spirit may be obtained either by the method of allowing the mixture to stand for some length of time, or by reducing the alcohol without allowing it to stand.

MR. CASPARI: Do I understand you to say that the addition of alcohol at once to the mixture of ammonium carbonate solution and ammonium hydroxide will not cause precipitation at all, provided the amount of alcohol be reduced?

MR. HALLBERG: Yes; I know it from an experience of many years. I do not remember the amount to which the alcohol should be reduced, but I used it for years before this particular process was recommended.

MR. REMINGTON: I would throw out a suggestion in regard to this subject, which has caused so much discussion in pharmaceutical journals. Why shouldn't we have an aromatic spirit of ammonia with the carbonate of ammonium left out? Of what use is it in this preparation? I am speaking from a medicinal point of view. It has given trouble not only here, but the English pharmacists have had the same trouble with it. The stimulating effect of the alcohol is needed, and the flavoring of the oils as a medicinal preparation. Now, the amount of carbonate of ammonium which is present here is not enough to affect it, in any way whatever, and I think we ought to consider it—not for the next Pharmacopœia perhaps, but merely think about it. The aromatic spirit of ammonia is such a sacred preparation, having come down from our ancestors, that it is sacrilege possibly to take out carbonate of ammonium at this time, but it is a suggestion to think over.

MR. KREMERS: I wish to acknowledge an error that I have made, and to say that Dr. Curtman is correct. The explanation that might be offered, however, I would suggest is this, that it may depend upon what the Germans call "massenwirkung" and upon the ratio of bicarbonate and monocarbonate, whether decomposition takes place or not. We know that it has been demonstrated that water may act as an acid in relation to some substances, and in this case it may act like a dilute acid; this may be true when the bicarbonate and carbonate are mixed in certain proportions, and then evolution of carbonic acid may take place under certain conditions.

The following paper was presented by the author:

## AMERICAN POTASH.*

BY J. U. LLOYD.

American potash was formerly an article of much importance, and was exported from this country in large amounts. The New England States

* Answer to Query No. 22. A paper on potash as now made in the United States.

were at first the principal producers of potash, Boston, where it is now of no consequence, once being the great export market. With the destruction of the forests the source of supply receded from the East, progressing westwardly from New York and Pennsylvania into the States of Ohio, Kentucky and Indiana, in which, until a comparatively recent period, more or less was manufactured, but, at present, throughout these States only a few stray casks now drift into the hands of wholesale druggists or commission merchants.

However, contrary to general opinion, the manufacture of potash is still carried on in some parts of the Northwest (now Central States) on a considerable scale. In the neighborhood of the forests of Northern Michigan, and in portions of the Provinces of Canada, this substance is still systematically manufactured the year through. The hard-wood stump lands from which the timber trees have been cleared are thus made to contribute a second time to the benefit of the settlers.

### WHAT IS POTASH?

Few would hesitate to attempt to answer this question, and yet the commercial substance is not so easily defined as might be imagined. Potash should be the residue that is obtained by lixiviating the ashes of wood and evaporating the lye to dryness. It is in reality an unknown quantity, owing to the fact that more or less lime (when largely insoluble) and common salt are used in its manipulation. Leaving out the question of *added salt* and *slaked lime*, potash is a mixture of:

Insoluble matter, 1.5 to 3 per cent.
Sulphate of potassium, 5 to 15 per cent.
Chlorides of sodium and potassium, 5 to 10 per cent.
Carbonates and hydrate of potassium, 80 to 95 per cent.
Such is the ideal potash, the true residue from wood ash lye.

### WHAT IS THE PRESENT QUALITY OF COMMERCIAL POTASH?

I give my own experience only, estimating the value of commercial potash from its *alkali*, which is not exactly a correct method, owing to the fact that this includes sodium alkali. I value it from its saturating power, and no attempt is made to identify the nature of the alkali, as it would be a useless expenditure of time. I give the maker full credit for soda (if it exists as alkali therein) as well as potash, which is probably often to his advantage. In order to illustrate the variation in ordinary commercial potash, for the benefit of those who have no personal experience with the substance, I append the following table. Each assay represents a cask, each cask weighs from 650 to 700 pounds. The amount is the average of a car load of "First Sorts" potash purchased before my standard of alkali percentage was established, the assay of every other cask being given.*

* Probably the dealer would be much surprised could he see these figures, but as collectors purchase "sight unseen," and sell in original packages, he need not be personally disturbed.

Thus I answer the question, "What is commercial potash?" by saying, often a mixture largely of common salt (sometimes lime also) and evaporated lye. Specimens average, as shown by the following table, from 16.56 per cent. KOH* to 84 per cent.:

Weight of car load, sixty casks, .................... 40,100 pounds.
Average percentage KOH ........................ 58.45 per cent.

| Percentage KOH.† | Percentage KOH. |
|---|---|
| 16.56 per cent., | 61.60 per cent., |
| 26.88 " | 63.84 " |
| 30.24 " | 64.95 " |
| 32.43 " | 66.08 " |
| 34.72 " | 67.20 " |
| 35.84 " | 69.44 " |
| 44.85 " | 70.56 " |
| 47.00 " | 71.07 " |
| 50.40 " | 73.92 " |
| 53.76 " | 76.16 " |
| 56.00 " | 78.96 " |
| 57.06 " | 80.08 " |
| 57.06 " | 80.64 " |
| 58.24 " | 83.49 " |
| 60.48 " | 84.00 " |

That the matter of irregular qualities is not a new subject is shown by Dr. Beck's paper, 1831, where he predicts that "American potash cannot surely retain its high character, if the consumer finds it to contain one-third or one-fourth its weight in soda salts." I will say that, while much of the potash that is thrown upon this market is still of uncertain quality from "soda salts," I take pleasure in noting that some dealers are now able to supply much better potash in large amounts than formerly, but I must admit that others are not as successful as they would like to be.

### STANDARD.

In the absence of an official standard I have made one of my own, which is 70 per cent. KOH, and can now get American potash to average that test, as will be shown later on.

Having first demonstrated that it was possible for makers to meet that requirement, dealers were notified that unless the product averaged that amount of alkali it would be rejected.

For a long period after making the standard, every cask consumed was assayed, and that which was below par was thrown back to the dealer. Much trouble was experienced at first, as is exemplified by the following table that gives the average value of a carload received on guarantee, and in which the merchant was much disappointed to find it rejected.

* It is exceptional to find so low a value as this.

† The carbonate and hydrate combined, calculated as KOH.

| KOH | KOH |
|---|---|
| 42.56 per cent., | 58.24 per cent., |
| 52.64 " | 59.36 " |
| 52.64 " | 59.36 " |
| 53.76 " | 63.84 " |
| 54.88 " | 66.08 " |
| 56.00 " | 66.08 " |
| 57.12 " | 75.04 " |

Average value found, 58.40 per cent.

Standard; 70 per cent.

Word must have eventually reached potash-makers supplying our market to the effect that the heavy "salting" business must stop. Some dealers, however, seemed unable to control the matter, and could not guarantee more than 60 per cent., but others, more successful, have established their qualities and now seem to have no trouble in obtaining potash by the carload that will average upwards of 70 per cent. The following table gives the value of twelve carloads, accepted during the past twelve months, and the averages may be compared with those of the preceding tables by those interested in this subject.

*No. 1. Car load, 70 Casks.*

46,490 pounds.—Lowest, 66.64 per cent.; highest, 85.68 per cent.; average, 77.84 per cent.

*No. 2. Car load, 48 casks.*

31,500 pounds.—Lowest, 68.32 per cent.; highest, 82.88 per cent.; average, 73.84 per cent.

*No. 3. Car load, 67 casks.*

45,529 pounds.—Lowest, 60.48 per cent.; highest, 85.12 per cent.; average, 73.97 per cent.

*No. 4. Car load, 61 casks.*

40,631 pounds.—Average, 71.41 per cent.

*No. 5. Car load, 60 casks.*

39,791 pounds.—Average, 72.21 per cent.

*No. 6. Car load, 60 casks.*

40,124 pounds.—Lowest, 67.76 per cent.; highest, 77.28 per cent.; average, 71.62 per cent.

*No. 7. Car load, 60 casks.*

39,833 pounds.—Lowest, 77.28 per cent.; highest, 91.28 per cent.; average, 81.81 per cent.

*No. 8. Car load, 70 casks.*

46,991 pounds.—Lowest, 68.80 per cent.; highest, 86.80 per cent.; average, 75.15 per cent.

*No. 9. Car load, 70 casks.*

46,490 pounds.—Lowest, 58.80 per cent.; highest, 77.28 per cent.; average, 68.82 per cent.

*No. 10. Car load, 60 casks.*

39,833 pounds.—Lowest, 64.96 per cent.; highest, 78.96 per cent.; average, 70.22 per cent.

*No. 11. Car load, 63 casks.*

41,397 pounds.—Lowest, 60.45 per cent.; highest, 80.64 per cent.; average, 72.40 per cent.

*No. 12. Car load, 67 casks.*

45,529 pounds.—Lowest, 59.36 per cent.; highest, 81.20 per cent.; average, 72.63 per cent.

*Summary.*

From the foregoing is established the fact that a total of five hundred and four thousand one hundred and thirty-eight (504,138) pounds averaged 73.5 per cent. KOH; that three car loads averaged over 75 per cent. KOH, while one car load averaged over 80 per cent. This evidence should establish the fact that a standard of 70 per cent. KOH is attainable.

WHO CONSUMES THE SALTED POTASH?*

This it is difficult to determine. The consumption is probably distributed among small users, who do not assay, but purchase their supplies by the names first sorts, second sorts, and third sorts. These traditional terms, so far as I can learn, have now no definite significance. They seem to refer to the appearance of the cask or the beauty of the contents, and I might add, the more salt there is in an admixture, the prettier the "ash." The poorest potash I have seen was sold as first sorts.

WHO IS RESPONSIBLE FOR THE ADULTERATION?

Not the dealers in potash. They purchase it from the producers, a cask here and a cask there, as it comes to their market. They buy it on faith and sell it in original packages; the most aggravated party in the matter is probably the dealer, and he should have our sympathies. Perhaps not the mixer either, altogether. For generations it seems to have been customary to add more or less salt to the contents of the kettle just

* I cannot deny that salt is used in the "finishing" of even 70 per cent. potash, but not an excessive amount.

before it is "melted down," and sometimes lime is also added. This not only increases the yield and helps it cake, but adds to its appearance. This privilege seems to be a sacred inheritance, a birthright of the maker, sanctioned by the strong arm of the government, as witness a patented method for making *one barrel* of potash, issued to a resident of New York in 1831. This is the formula:

"First, take half a bushel of salt, sprinkle half of it over the top of the potash;* secondly, take two bushels of slaked lime, add that in the same manner, then the remainder of the salt, and when the lime has disappeared, then add half a pint of lamp oil. This is the quantity used for one barrel, but it may be varied as the nature of the case requires."—*Am. Journ. Pharm., 1837, p. 30.*†

The nature of commercial potash, as is seen from the foregoing averages, seems to indicate that this process may be still "varied as the nature of the case requires." Taking it altogether, I am willing to concede that the most responsible party is the *consumer.* He has neither the excuse of ignorance nor hard, close competition, as have most of the uneducated potash makers. Nor have consumers the unconcern of the commission merchant, who is a handler only, and that too in original packages, and, however desirous of obtaining good qualities, unless aided by consumers is powerless to alter conditions.

### CHARACTER OF GOOD POTASH.

This is generally opaque, of a dull gray, slate, or bluish color, often streaked with red or greenish stains (see samples). It deliquesces on exposure to the air and becomes slowly pasty. It is mostly (unless much lime is present) soluble in water. Sometimes it presents a whitish appearance in the center of the cake, and occasionally is honeycombed. This description will generally average 70 per cent. and upwards, KOH. That which is largely mixed with salt is usually crystalline, often nearly white, pearly and translucent, or of a beautiful delicate pink,‡ and seems to be the mostly highly valued by those who judge only from appearances.

### SUMMARY.

1st. Commercial potash of American make is of uneven quality, much of it being largely adulterated with salt and lime.

2d. By persistently rejecting the lower grades, consumers can improve the quality so that a standard of at least 70 per cent. KOH is attainable, and it is probable that by united efforts a standard of 75 per cent. could be established.

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* Melted in the kettle L.

† And, it might be added, as the consumer permits.—L.

‡ Referring to this appearance establishing its position as 1st sorts, Dr. Beck, Am. Jour. Pharm., 1831, says: "A premium is thus, in effect, set upon injurious adulterations."

3d. Dealers in potash are not responsible for the quality that passes through their hands unless they guarantee an alkali standard, for the term "sorts" has no fixed significance.

4th. Unless American makers become more careful, it seems evident that the industry must be discredited and disappear altogether. They cannot hope to long compete with the refined, uniform carbonates and hydrates from Germany, now seeking our market, nor the sheep wool, crude potash (suint) from France.

5th. In view of these facts, and to preserve the industry, as well as protect the interests of those who make high-grade potash, it seems that a standard should be established by some authority. In case this were done, the adulteration laws of many states would prevent low grades from entering the general market, and thus improve the product.

MR. ECCLES: Last year, in assaying for the government a number of samples, I found none of them up to the pharmacopœial requirements in point of quality. They were supplied by a large house in New York that has the contract for the government supplies. I rejected some six specimens, and finally they declared that it was impossible for them to find, in the American market, any potash up to the standard of the Pharmacopœia. I would like to ask whether any one present can explain whether that statement is true or not?

MR. SIMON: The question has been asked whether or not the American potash can be obtained up to the U. S. P. standard. I will say that in twenty years I had under my own observation hundreds of tons of American potash, and not a single cask was up to the standard of the U. S. Pharmacopœia.

MR. MAISCH: In other words, that means that in order to obtain it of the pharmacopœial standard, it would be necessary to submit it to such manipulation as would increase its cost beyond the actual value obtained.

MR. SIMON: That is exactly the point. Professor Lloyd, in one sentence, points out the fact that the days of the manufacture of American potash are over. I think the industry will soon die out entirely and completely, because our forests are now regarded as more valuable than they formerly were. Besides, an unlimited supply of potash is now given by the phosphate fields, which will hereafter supply the potassium carbonate until new discoveries are made. The imported article comes up to the requirements of the Pharmacopœia. It can be bought as high as 98 per cent.

MR. PATCH: Our common American makes average from 50 to 75 per cent., while formerly it was possible to obtain potash that would range from 87 to 94 per cent.

MR. LLOYD: The German carbonates and the German calcined hydrates can be purchased from 96 to 98. I use them by the car-load, and find that they will run usually to the higher figure, 98. I will call your attention also to the fact that there is a great deal of cheap wood potash coming in from France, mentioned in my paper, which we get by the cargo, guaranteed, and running as high as 75 per cent.

MR. CASPARI: I believe the potash in sticks usually supplied—and that is the kind with which we are more immediately concerned—is not up to pharmacopœial requirements at any time. However, if a specially pure article of potash be ordered, it will very likely run much higher.

## ON THE JUICE OF TARAXACUM.*

BY L. E. SAYRE, PH. G., UNIVERSITY OF KANSAS.

In a communication from the chairman of the Scientific Section, it was suggested that I take up the investigation of taraxacum root, as suggested by Queries 11 and 12.

In response to the request I consented to do as much work in the investigation as my time would allow, but as the meeting of the Association takes place much earlier this year than usual, little time is allowed for the experiments necessary.

Some years ago this subject received considerable attention, and from the pens of very able men. We find communications upon it especially in the *Pharmaceutical Journal and Transactions*. But it would seem from a review of this literature that high authorities differ, and entirely satisfactory results were not arrived at. Moreover, we find by consulting the various authorities—*Universal Pharmacopœia*, United States Dispensatory, and the pharmaceutical literature of some years ago—that very different seasons of the year are recommended as the best time for collecting the root. One recommends the beginning of spring, even before blooming; another, July, August and September, as the proper period for collecting; another, that it should be gathered between September and February. It would therefore seem to be an unsettled question, and worthy of being brought forward anew, so that it might receive further consideration.

The time at my disposal has been insufficient to examine the root for such constituents as *taraxacin* and *inulin*, but if I be allowed to continue the subject for next year, I shall be glad to make an estimation of these constituents, as found in the root in the different months of the year.

But one lot of the root, that collected in May, could be examined at all and reported upon in time for the present meeting.

The present experiments include the estimates of moisture in the fresh root, moisture in the dry root, etc.

Examination of taraxacum root collected May 10th, 1892.

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*Answer to Query 11. Composition of the Juice of Taxaracum Root. It is desirable to determine at intervals during the year, beginning as early and continuing as late as possible: 1st, the percentage of juice obtained by expression; 2d, its specific gravity; 3d, its total solids; 4th, ash; 5th, sugar; 6th, inulin and other amyloid bodies; and 7th, its bitter principle. And to

Query 12. It is claimed that it is becoming yearly more and more difficult to obtain a taraxacum root collected at the proper season and of proper quality, and that a valuable drug is in danger of being discredited and discarded from this cause. Has the proper season for gathering been fully and satisfactorily settled, and how can the quality of the drug be most easily determined?

| | | |
|---|---|---|
| Moisture in fresh root, dried at 45°, | 79.42 | per cent. |
| Loss in drying the air-dry root at 100° | 10.68 | " " |
| Percentage of juice extracted | 57.00 | " |
| Specific gravity of juice | 1.007 | " |
| Percentage of solids in juice | 1.472 | " |
| Sugar in the juice | 0.036 | " " |
| Percentage of ash from juice | 0.0045 | " " |

The juice after expression had a decided bitter taste.

LAWRENCE, KANSAS, *May 15, 1892.*

MR. MAISCH: I wish to call attention to a figure in the author' stable where it is stated, that drying at 100° 10 per cent. is lost; but the original loss amounting to over 79 per cent., left only 20 per cent. of air-dry material, and this would have still contained 50 per cent. of moisture, in case the figure 10 applies to the weight of the original fresh root. It is known that the spring root yields less dry material than the fall root.

## APPLICATION OF VOLUMETRIC ANALYSIS TO OIL OF WINTERGREEN.*

BY BENJ. H. EWING, PH.G., EWINGVILLE, OHIO.

The composition of oil of wintergreen and its well-known commercial substitute, oil of sweet birch, has been the subject of repeated investigation, the tendency of which has been to prove the constituents of the two oils to be identical, or the existence of a slight difference in favor of the birch product, as being a more nearly pure representative of absolute natural methyl salicylate; yet, to the author's knowledge, no easy method has been proposed for the use of the pharmacist in estimating the salicylic value of the article before making a purchase in the market.

Being composed of a definite chemical compound, the deportment of which with alkalies is well-defined, there remains no reason why volumetric analysis should not be applied to this purpose.

With a view of proving the feasibility of such a method, in January of the present year the writer obtained two genuine specimens (one oil of gaultheria, the other oil of sweet birch) through the kindness of Mr. C. M. Driggs, of White Haven, Pa., who has furnished other investigators with authentic specimens of these oils. These, with a specimen of the commercial oil obtained from a prominent dealer, were first subjected to a gravimetric assay according to the following process:

A small, convenient quantity (1.5 to 2 gm.) was weighed in a tared flask of 50 c.c. capacity, a slight known excess of a strong solution of soda added, the flask securely corked, and the contents rotated over a moderate heat until the disappearance of the precipitate formed by the soda solution. After cooling, the cork was removed, and the liquid again subjected to heat for five minutes, this time at the boiling point, after which it was

* Under supervision of Wm. Simonson, Ph.G., Chemical Laboratory, Cincinnati College of Pharmacy.

transferred to a separatory funnel, where it was treated with a slight excess of hydrochloric acid, and the precipitated salicylic acid taken up by shaking the resulting mixture with two volumes of ether. After subsidence, the aqueous stratum was drawn off into a second separator and shaken with two volumes of ether; again drawn off into a third separator, after subsiding, and shaken with one volume of ether; when, upon resting, the aqueous solution was finally drawn off, found to be free from salicylic acid, and rejected.

The ethereal solutions in the separators were then washed in succession, four times, each time with two volumes of distilled water, to free them from sodium chloride. That in the first separator was transferred to a tared platinum dish, as was that in the second, after passing through the first, and that in the third, after passing through the second and thence also through the first. The ethereal liquids were carefully evaporated, and the residue dried over sulphuric acid to a constant weight.

W. Simonson was kind enough to verify each estimation made by this method.

A plan for volumetric estimation was now devised, which, in outline, consists in saponifying a weighed portion of the oil with an excess of normal solution of soda, and neutralizing the excess with normal hydrochloric acid, and in detail as follows:

Weigh 5 gm. of the oil in a tared flask of 100 c.c. capacity, and pour upon it 40 c.c. volumetric solution of soda. Cork the flask securely, and heat the contents at 60° C. until the precipitate formed at first has totally disappeared. Cool, remove the cork, and again apply, and maintain heat at the boiling point for five minutes; again cool, add enough solution of phenolphthalein to impart a red color, and then enough normal hydrochloric acid to render the liquid neutral, as will be sharply indicated by the disappearance of the red color. Subtract the volume of acid required from 40, and multiply the remainder by .138 (one-thousandth of the molecular weight of salicylic acid), and the resulting product by 20, to get the per cent. of salicylic acid; or multiply the remainder by .152 (one-thousandth of the molecular weight of methyl salicylate), and the resulting product by 20, to get the per cent. of methyl salicylate.

This method was applied to each specimen of oil, the following table showing the results compared with those obtained by the gravimetric method:

| | GRAVIMETRIC. | | VOLUMETRIC. | |
|---|---|---|---|---|
| Specimen. | Salicylic Acid. | Methyl Salicylate. | Salicylic Acid. | Methyl Silicylate |
| I. Genuine oil gaultheria | 89.56 per cent. | = 98.65 per cent. | 90.15 per cent. | =99.30 per cent. |
| II. Genuine oil sweet birch | 90.54 " " | = 99.72 " " | 90.20 " " | =99.40 " " |
| III. Commercial oil wintergreen | 90.65 " " | = 99.85 " " | 90.15 " " | =99.30 " " |

Three more specimens of the commercial oil, obtained from different manufacturers of natural salicylic acid, were estimated by the volumetric

method, one of which proved to be absolute methyl salicylate, the other two 99.10 per cent. and 99.50 per cent. respectively.

This method has since proved effectual in one instance in detecting an oil offered for sale by a traveling broker, which contained but 68 per cent. of methyl salicylate.

*Cincinnati, O., May 25th, 1892.*

MR. LLOYD: I would like to ask whether Professor Simonson's method is not used in this paper?

MR. FENNEL: The paper was printed according to the directions of Mr. Simonson, and he is entitled to the credit. The volumetric method given here is interesting.

MR. CASPARI: Professor Power suggested, I think, to the Revision Committee, a similar method for determining the purity of oil of wintergreen, and an article of his was published a few months ago in some of the journals, where he stated that certain quantities of the oil and warm soda solution would give a perfectly clear solution, indicating an absolutely pure oil of wintergreen. If that is the case, what is the use of determining the acid volumetrically? I think that the Pharmacopœial Committee should indicate some method for determining the purity of oil of wintergreen without the troublesome gravimetric or volumetric method.

Secretary Fennel read the following paper:

## SOLUTION OF BIMECONATE OF MORPHINE.

BY ALICE L. BRAUNWARTH, PH. G., MUSCATINE, IOWA.

Although this preparation of opium has been in great favor for many years, no positive formula for its preparation nor standard for strength exists in any authoritative work. In view of these facts the work was undertaken, and the following data obtained. At the outset it became necessary to decide upon a precise method for the estimation of morphine, the preliminary trials being made upon a commercial specimen of sulphate of morphine:

Water, by drying at 140°–to 160°C.

$H_2SO_4$, as barium sulphate.

Morphine, by separation from a strong aqueous solution of ammonia, and purification by amyl alcohol.

*Results:*

| | |
|---|---|
| Water—1.0372 lost at 140°–160°C., 0.1145 $H_2O$ ............ = | 11.04% |
| Sulphuric acid—0.6797 produced 0.2110 $BaSO_4$ ............ = | 13.06% |
| Sulphuric acid—0.9607 produced 0.2980 $BaSO_4$ ............ = | 13.05% |
| Morphine—0.2644 produced 0.2011 $C_{17}H_{19}NO_3$ dry at 110°C... = | 76.06% |
| Total. ........................................ | 100.16% |

On applying amyl alcohol to morphine estimations, several practical difficulties were encountered. Very much more of the solvent is needed than would be supposed from the stated solubilities of the alkaloid. Thus Prescott states that solubility is 1–97, but in precipitation it was found to

be soluble in about ⅓ that quantity, yet readily crystallizing from this solvent, and when equilibrium was established the solubility was found to be 1 in 160–200. Secondly, the high solubility of the solvent in water requiring repeated washings. Thirdly, extreme slowness of evaporation.

Conclusion.—While amyl alcohol is necessary in rigidly accurate morphine estimations, it is practically useless when a large number of estimations are made, owing to the labor and time attending its use.

Ethyl acetate is free from these objections and yet defective, owing to its deficient solvent power of the alkaloid, requiring 600 parts for 1 of alkaloid.

Under such conditions the ammonia precipitation was resorted to, and the following factors considered:

First. Solubility in water of the alkaloid, and in slightly ammoniated liquid resulting from the precipitation.

1st. In water.

Morphine 2.00 shaken for 24 hours with 50 c.c. water, filtered in a filtering tube through a small plug of well cleaned asbestos, a weighed portion of the clear filtrate evaporated to dryness in a tared platinum dish, and drying at 100°–105° C.

Result, 0.0178 $C_{17}H_{19}NO_3$. Solubility, 1 part morphine in 1806 parts of water.

2d. *a*. Morphine 0.3311, dry at 110° C., dissolved in little water with the least possible excess of hydrochloric acid, diluted to 20 c.c., precipitated with 5 c.c. of ammonia water, 1 per cent., during 24 hours, collected in a small tared filtering tube, washed with 5 c.c. of water in portions of 1 c.c., dried at 100° C. to constant weight. Loss 0.0157, indicating solubility of one part of morphine in 1600 parts of the liquids.

*b*. Morphine 0.3181. Morphine lost 0.0131, corresponding to a solubility of 1 part in 1530 parts of the fluids. Correction, therefore, 1–1600 in precipitating liquid was adopted.

### MECONIC ACID.

While meconic acid is a tribasic acid, and forms with silver and other univalent metal elements, more than one salt, it combines with lead in but one proportion, forming the triplumbic meconate $Pb_32C_7HO_7$. Whether obtained in neutral or (acetic acid) acidified solution, or from an aqueous solution of free meconic acid, the lead salt was always the same, proven by the estimation of lead in the precipitate as oxide or sulphate. The *quantity*, however, will vary with the degree of acidity of the solution (acetic acid being the free acid). The variations were determined as follows, the precipitate being dried at 125° C. (below which temperature the salt cannot be obtained anhydrous):

1st. Free meconic acid:

0.2740 $H_3C_7HO_73H_2O$ gave 0.5370 $Pb_32C_7HO_7$. Calculated 0.5460, a recovery of 98.4 per cent.

2d. Free acid:

0.2770 $H_3C_7HO_7 3H_2O$ gave 0.5412 $Pb_3 2C_7HO_7$. Calculated 0.5512, a recovery of 98.2 per cent,

3d. Free acid in 1 per cent. acetic acid solution:

0.287 $H_3C_7HO_7 3H_2O$ gave .5553 $Pb_3 2C_7HO_7$. Calculated 0.5725. Recovery of 97.0 per cent.

Conclusion: Exact determinations of meconic acid require, therefore, very neutral solutions for its precipitation as lead meconate. A single estimation of water in the specimen of meconic acid gave 23.35 per cent., leaving 76.65 per cent. $H_3C_7HO_7$ equivalent to 97.34 per cent. $H_3C_7HO_7$-$3H_2O$. With this correction for 2.65 per cent. water in the crystals, the estimations as lead meconate are fairly satisfactory.

EXAMINATION OF COMMERCIAL SOLUTIONS OF MORPHINE LABELED BIMECONATE.

It was found that but one product of a single laboratory existed. Examined as follows: Total solids dry at 100° C., alcohol, morphine dry at 100° C., meconic acid.

*Results.*

Solids: 5.067 gave 0.046 residue at 100° C. = 0.908 per cent.

Alcohol: 25 c.c. diluted to 50 c.c. and slowly distilled until 25 c.c. distillate were obtained; sp. gr., 0.9666, indicating 29 per cent. volume = 24 per cent. by weight of absolute alcohol.

Morphine: 30.0 evaporated to 15 c.c. transferred to a small flask, fluid and rinsing having a volume of 20 c.c.; precipitated by 2 c.c. 1 per cent. ammonia water; after twelve hours, precipitate collected in a small tared filtering tube, washed with 7–8 c.c. water in 5 portions, dried at 100° C., and weighed: 0.240 $C_{17}H_{19}NO_3$ = 0.80 per cent.

Meconic acid: 24.25 solution diluted to 100 c.c. and precipitated by 0.500 lead acetate in 50 c.c. water gave a washed, dried precipitate = 0.41 equal 0.0205 meconic acid crystals = 0.085 per cent.

This quantity of meconic acid is sufficient to saturate 0.363 morphine or 45.3 per cent. of the total amount contained in the solution.

FURTHER TESTING FOR ACIDS.

Hydrochloric acid was found, estimated as silver chloride; 25.25 gave 0.090 $AgCl_2$, equivalent to 0.023 HCl, or 0.091 per cent.; if combined with morphine, equivalent to 89 per cent. of the total.

RESUMÉ.

The commercial solution is therefore, in its essentials, a 1 per cent. solution of *hydrochlorate of morphine* in 24 per cent. alcohol containing $\frac{1}{10}$ per cent. meconic acid.

Medical practitioners prescribe the preparation on a basis of strength equivalent to the liquid preparation of opium as directed in the pharma-

copœia, and consequently the preparation is about half strength. The following formula will produce a preparation such as desired:

| | |
|---|---|
| Morphine crystals | 16.0 parts. |
| Meconic acid crystals | 7.0 " |
| Alcohol, 91 per cent. | 265.0 " |
| Distilled water | 715.5 " |

Dissolve the morphine and meconic acid in 100 parts of water by heat, cool, add alcohol and sufficient distilled water to make 1000 parts.

*Chemical Laboratory, Cincinnati College of Pharmacy, Supervision of Wm. Simonson, Ph.G.*

MR. MAISCH: I wish to say that the solution of bimeconate of morphine was introduced many years ago under the supposition that morphine existed in opium in combination with meconic acid, and that in making such a solution, the morphine was in its natural condition. That such is not the case has been abundantly proved. I believe Flückiger was the first to show that the percentage of meconic acid in opium was insufficient to saturate all the alkaloids present, and it was subsequently shown by different investigators in different countries, and last, by Dr. Dohme, that the morphine exists in opium combined with sulphuric acid, and not with meconic acid.

MR. HALLBERG: If it were not for the statement of Professor Maisch, it would be desirable that the formula be referred to the committee on the National Formulary. But, as far as my knowledge goes, the solution of bimeconate of morphine is not of sufficient importance to warrant its being so referred.

MR. FENNEL: In some sections of the country the solution is still prescribed a great deal, and some dispense a colored solution, while others give one that is absolutely colorless. This creates confusion in the mind of the practitioner, and it would be advisable to adopt some definite formula.

MR. MAISCH: Many years ago, I used to make the meconic acid from opium, and also the morphine, combining them again to obtain this solution, and no attempt was made to purify from coloring matter. The meconic acid may easily be obtained free from color, and the solution is then always colorless, as now used in England. The colored solution prepared from opium is made by a formula which, I think, was originated by Edward Parrish about thirty years ago. I regard the preparation as of no earthly value, compared with other morphine compounds, but if it is called for, it has to be supplied.

The Section now adjourned until 3:30 p. m.

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## SECOND SESSION.—SATURDAY AFTERNOON, JULY 16.

The Section met at 3:30 o'clock.

The minutes of the preceding session were read by the Secretary *pro temp.*, and on motion were approved.

The first business in order was the nomination and election of officers, and no further nominations being made, the Chairman was, on motion of

Mr. Whelpley seconded by Mr. Simon, directed to cast the ballot of the Section for the nominees presented at the previous session. The chair cast the ballot, and Messrs. Fennel and Ryan were declared duly elected Chairman and Secretary for the ensuing year.

Mr. Alpers, from the Committee on the Chairman's Address, read the following report:

Your Committee report that having carefully gone over the address of the Chairman, they find one recommendation in particular worthy of consideration. It is the one relating to the publication of a periodical report on the *modus operandi* of the manufacture, composition, doses and uses of new remedies; but we fail to see how the suggestion as to the financial considerations could be carried out.

W. C. ALPERS,
DAVID M. R. CULBRETH,
HUGO W. C. MARTIN.

The report was, on motion, received, and Mr. Remington requested the Chairman to explain somewhat in detail his views concerning the proposed periodical report.

CHAIRMAN HALLBERG: Briefly stated, my idea is this: That inasmuch as every retail pharmacist cannot send out a little compilation of his own describing new remedies, preparations, etc., like the National Formulary, giving bases, principles, indications, etc., it occurred to me that if this work could be delegated to two or three men who would undertake to do it, that pharmacists would be very glad to obtain a certain number of copies, and, of course, defray the expenses of publication. In other words, if a Committee were appointed to carry on this work, they would obtain from say 100 members, orders for an average of ten copies each of such a little pamphlet, which would be a thousand copies. If it would require $100 to get out this report, they could then be supplied to pharmacists, possibly ten copies for one dollar, and by them distributed among the physicians in their neighborhood. As soon as there was sufficient material on hand, the publication of another edition could be undertaken. I should judge about four times a year, there would be sufficient material on hand to present to the profession. This would give the pharmacist a means of fighting the devil, as we might say, with his own weapon. You know very well that that is how the manufacturers build up a demand for their goods, and force the pharmacist practically to handle them. By such an associated effort the retail druggist could cope with them, and if this were followed up by samples of the preparations, there is no reason why it should not be as effective as it is with the products of larger establishments. I will say, furthermore, that I am willing to be one of the three to undertake this as an experiment. The Association would not be at any expense at all, and I would like to try it.

MR. MARTIN: The reason why the Committee brought in such a report as it did, was that they could not see how the finances could be taken care of. According to the Chairman's suggestion, it seems that three men would be willing to offer their services, and make a trial of the affair. It is doubtful, of course, whether you could get three men who would be willing to go to the expense of publishing a work of that kind, seemingly at their own expense, and take their chances of getting back their money by charging something for the publication.

MR. RUSBY: I would inquire how the pharmacists whose products would be entitled to entry in this pamphlet would be limited; how large must an establishment be before

its products would be excluded from it—or would you be willing to include in it the products of any house, a large manufacturing house or small retail pharmacy?

THE CHAIRMAN: It is difficult to draw the line between what you would call a manufacturing house and a retail pharmacy, because there are some that occupy an intermediate position. What originally led to the proposition was the comparative success I obtained in getting out an epitome of the National Formulary, and it was intended that this should include the preparations of the National Formulary and similar semi-official preparations; and preparations proprietary in character would not be incorporated, according to my idea. I might probably say that I am satisfied that there are three men in this Association who will be glad to take hold of this project as an experiment, and without expense to the Association.

MR. REMINGTON: With this statement from yourself, and the fact that it has been the subject of considerable thought, I think the principal objection made by the Committee has been removed. As I heard the suggestion, it seemed to me that it was a very valuable one. I suppose this would go out under the auspices of the Section?

THE CHAIRMAN: Yes, sir.

MR. REMINGTON: The American Pharmaceutical Association would then be responsible for it, as it would be published under its auspices, and not under the individual names of the committee. Of course, if the work is well done, and I have no doubt that it will be, it would be a very useful way of drawing attention to this Association and increasing its usefulness, and also bringing to the attention of physicians the formulas and processes which are non-secret, which have been tried; and not only that, but it would be the means of calling attention to a matter which has been agitated for a number of years, and about which the State Pharmaceutical Associations have sent delegations to the Medical Associations—that is, to employ these very things. From that point of view alone, I think it would be a valuable aid to this Association. I cannot see any objection to it, if it is carried out in that way. I hope that the Section will authorize the appointment of such a committee.

MR. THOMPSON: I would move that this question, with this additional information, be now referred back to the Committee for a further report and discussion.

MR. MARTIN: I would state that we will report immediately, without any further consultation at all, because it was only the financial question which bothered us. That difficulty being removed, the Committee is unanimous in recommending the adoption of the Chairman's suggestion.

MR. REMINGTON: This work ought to go out under the auspices of the Association, and not the Section alone. If this committee is appointed and the matter is adopted here, the report, before it goes out, can be submitted to the Council, which will act, in the interim, upon it, and it will go out with the Association's imprint upon it. I will therefore make the following motion: "That the suggestions embodied in the Chairman's address be adopted by this Section; that a committee of three be appointed to take the matter in charge, that committee, when they have completed their labors, to submit the result of their work to the Council of the American Pharmaceutical Association; and that the books be published under the direction of this committee, with the approval of the Council."

I think any difficulty can be obviated by the Council authorizing its chairman to act for it in the matter of examining the work, should that be necessary.

MR. SIMON: The Council surely has the right to appoint a committee of either one or two, and such committee represents the Council.

Mr. Good seconded the motion, which was then put to a vote and duly carried.

Mr. Whelpley presented the following, which, on motion of Mr. Hechler, seconded by Mr. Voss, was accepted and adopted.

WHITE MOUNTAINS, *July* 15, 1892.

The Committee on Prize Essays recommend that the Ebert Prize for 1891 be awarded to J. U. Lloyd, author of the paper entitled "A Scheme of Assaying."

A. B. PRESCOTT,
H. M. WHELPLEY,
HENRY TRIMBLE.

The reading of papers was then resumed, the first presented being:

## THE BOTANICAL NAMES OF THE U. S. PHARMACOPŒIA.

BY HENRY H. RUSBY, M. D.

In offering for discussion this revision of the botanical names of our Pharmacopœia, I wish to remind you that there are several distinct questions involved, and to emphasize the importance of considering and deciding each of these questions upon its own merits, unbiased by considerations of the related questions.

My revision refers only to the botanical names contained in the definitions, not extending to the titles proper. For example, we have the title Brayera, the corrected definition of which will be "The female inflorescence of *Hagenia Abyssinica,* (Bruce) Gmelin." Now it is suggested that it is inconsistent to use the title Brayera after finding that the botanical name is really not Brayera, but Hagenia; and some claim that we should change the name Brayera in the title as well as in the definition. The same rule would require us to change the titles Asafœtida, Aspidium, Calumba, Cardamomum, Chimaphila, Cimicifuga, Cinchona, Gaultheria, Leptandra, Myristica, Prinos, Prunus Virginiana, Quassia, and possibly some others. My own feeling is that this is not advisable, and not in accordance with the instructions of the Convention. The titles and the names of the definitions stand on entirely different planes. The title is the common or working name of an article or product used by us, and is common property, its whole object and design being our convenience and the safety of the public. This is a sufficient reason for not making changes in such titular names. But I will say further that it is not true that another name in the title would be any more accurate from a scientific point of view, because such titles are not in any sense scientific names. They are names used in our art, which may or may not agree with the names of the plants from which the articles are derived.

The names of the definition, on the other hand, are in no sense our property. Such a name pertains only to botanical science, and its object is to inform us, with the greatest possible scientific accuracy and precision,

as to the name by which botanists designate the plant from which our article is derived. We have no right to make such names for ourselves, or to make use of those names which are not approved by the science with whose usages we should be at the most perfect agreement. In other words, we should, at each revision, make in the names of the definitions whatever changes are necessary to keep pace with the advance of botanical science, and we should understand clearly that in this there is no inconvenience to us involved, so long as the titles remain unchanged. It is with this view that I contribute the following to our knowledge of the names of our official plants:

As you will see, there are a number of names concerning which I have not been able to reach a decision, in some cases through lack of time, in others because this country does not afford the facilities required. I am still at work on these knotty points, and hope ultimately to settle all of them, and I earnestly solicit the advice and assistance of the members in every case where such can be rendered.

The several questions raised are as follows:

1. To what genus does the plant belong?
2. What species of the genus is it?
3. What are the proper names of this genus and this species?
4. How shall we cite the author or authors?

It is quite true that there is no official and authoritative reply to the first question. Each botanist is at liberty to unite several related genera, to hold them separate, or to make each of them into several others. Botanical science has not yet reached the point of possessing an authoritative council which shall pronounce upon such questions. So we are obliged to choose among the classifications presented. At present we have but one such modern classification which applies to our work, namely, the Genera Plantarum of Bentham and Hooker. Another, and probably more rational one, is in progress of preparation by Messrs. Engler & Prantl, and another by Baillon, but neither is yet completed. If our plants were all American, I should say, follow that American author whom we suppose to know most about American plants. But as we draw from the universal flora, so we must follow an author in the universal field, and Bentham and Hooker constitute our only one.

Question number two is even more difficult to answer. The differences of opinion among different botanists as to uniting several species are too great for us to indulge a hope of seeing an agreement. The decision of this point must therefore rest largely with ourselves, judging from our own knowledge of the plants and the weight of authority. Unfortunately we are not in a position in this country, in many cases, to form a judgment, as we are sadly deficient in collections of specimens of foreign medicinal plants. We must, to a great extent, follow European authorities regarding species limits.

Our position concerning the third question, "Which shall we adopt of several names which have been applied to the same genus or species?" is one which does not properly admit of dispute. Those who have followed this subject are aware that there are few plants which have not had more than one name applied to them, and that we cannot avoid making a decision concerning these. They are also aware that a selection cannot be made at random, for in a majority of cases it is determined by, or affects our decision in some other case, so that consistency is an absolute essential. It was early seen that the most disastrous and inextricable confusion would be certain, unless the botanists of the world should agree upon a set of principles and rules for getting the system of names simplified and keeping it so. Hence the famous International Botanical Congress was held at Paris in 1867, and here was formulated the only set of rules which were ever so adopted, and of course the only ones now in existence for our guidance. Upon their return from this Congress, some of the members found that these rules involved an amount of personal inconvenience to them greater than they had counted upon, and which they were unwilling to undergo. They trusted to their personal following to influence custom in opposition to the rules formulated and agreed upon. But as a distinctively personal influence of this kind dies with the individuals, the demoralization so produced could not be permanent. Only by the formulation of another set of rules, that is, by organizing an opposition, could a separate set of names be permanently maintained. But this could not be done. Every rational attempt tended straight toward the rules already in force. Departure from these was purely individual, and several individuals were likely to depart in different directions, thus increasing the confusion. To-day, therefore, there is little difference of opinion as to the advisability of adhering to the rules of the Paris Congress, under which rules this revision has been made. The central principle involved is that no name has a right to supersede the first name properly given to a plant, starting from the year 1737 for genera, and 1753 for species.

An absurdity is involved in a strict adherence to these rules, which, it is hoped, will be avoided by common agreement to amend. It is the duplicating of a name in the species and the genus. For instance, Linné called a plant *Anethum fœniculum*. It was afterward found necessary to transfer the species to the genus Fœniculum, and as it must carry its specific name with it, it becomes *Fœniculum Fœniculum*. The same rule would make *Taraxacum Taraxacum*, *Sassafras Sassafras*, etc. There is a general abhorrence of these double names, and I hope and believe that it will be agreed to abolish them; but this has not been done up to the present, so I print such names, together with those which would apply in the absence of this custom.

The greatest difference of opinion exists regarding the fourth and last question, "How shall we cite the name or names of the authors of names?"

It is largely to formulate rules regarding this question that the international convention has been called at Genoa this season. In this matter we can get little help from Messrs. Bentham and Hooker, for, however able they may be in classifying, their custom in citing names and authorities is reprehensible. I have here followed that method of author citation which seems to me the most useful to those using the reference, for I believe this is the highest consideration by which we can be governed. I feel strongly that the letter "L" should stand for Linné. It is perfectly intelligible and not cumbersome.

I have thought it an excellent thing, while at this work, to bring together in one place in print a record of all the places and dates of publication of our U. S. P. botanical names.

Of synonymy only enough is printed to explain the adoption of the name, and to exhibit changes from the present edition.

The use of the plus sign indicates that I have personally examined the original publication and verified the citation. In most other cases I have stated my authority.

ABSINTHIUM.—From *Artemisia Absinthium*, L., Sp. Pl., ed. 1, p. 848 (1753) +.

ACACIA.—From *Acacia Senegal*, Willd., Sp., 4, p. 1079 (1809), *fide* D. C. Prod.

ACONITUM.—From *Aconitum Napellus*, L., Sp. Pl., ed. 1, p. 532 (1753) +.

ALLIUM.—From *Allium sativum*, L., Sp. Pl., ed. 1, p. 296 (1753) +.

ALOE SOCOTRINA.—From *Aloe Perryi*, Baker, Journ. Linn. Soc., xviii, p. 161 (1881) +. The only other species of Aloe found on the island is *A. squarrosa*, Baker, of which only occasional specimens are to be seen. A full account of the occurrence of the plant and the collection and marketing of the product can be found in the introduction to the above work by Mr. Balfour.

ALOE BARBADENSIS.—From *Aloe vera*, (L.) Webb., Phyt. Canar., iii, p. 348 (1836–'50), *fide* Pfeiffer.

Synonyms: *A. perfoliata*, var. *vera*, L., Sp. Pl., ed. 1, p. 320 (1753) +. *A. barbadensis*, Mill., Dict., No. 2 (1759) +. *A. vulgaris*, Lam., Encyc., i, p. 86 (1783) +.

ALTHÆA.—From *Althæa officinalis*, L., Sp. Pl., ed. 1, p. 686 (1753) +.

AMMONIACUM.—From *Dorema Ammoniacum*, D. Don, Trans. Linn. Soc., xxi, p. 602 (1833) +.

AMYGDALA AMARA AND AMYGDALA DULCIS.—Respectively from *Prunus Amygdalus*, var. *amara* and *dulcis*, D. C., Fl. Fr., 4, p. 586 (1805).

AMYLUM.—From *Triticum aestivum*, L., Sp. Pl., ed. 1, p. 85 (1753) +. Linné proposed a number of distinct species of Triticum, all of which seem, in the light of modern knowledge and judgment, to form but one. The above name was the first, and takes precedence. The following were much later:

Synonyms: *T. vulgare*, Villars, Velph., iii, p. 153 (1787), *fide* Kunth, Enum.; *T. sativum*, Lam., Encyc., ii, p. 554 (1787) +.

ANISUM.—From *Pimpinella anisum*, L., Sp. Pl., ed. 1, p. 264 (1753) +.

ANTHEMIS.—From *Anthemis nobilis*, L., Sp. Pl., ed. 1, p. 894 (1753) +.

APOCYNUM.—From *Apocynum cannabinum*, L., Sp. Pl., ed. 1, p. 213 (1753) +.

ARNICÆ RADIX ET FLORES.—From *Arnica montana*, L., Sp. Pl., ed. 1, p. 884 (1753) +.

ASAFŒTIDA.—From *Ferula fœtida* (Bunge), B. & H., f., *fide* B. & T.

Synonyms: *Scorodosma fœtida*, Bunge, Mem. Sav. Etrang. Acad. St. Pet., vii, p. 309, and Linnæa (1851), p. 157, +. (?) *Ferula Asafœtida*, L., Sp. Pl., ed. 1, p. 248

(1753) +. *Narthex Asafœtida*, Falconer, Trans. Linn. Soc., xx., p. 285 (1846) +. *Ferula Scorodosma*, B. & T., Med. Pl., ii, No. 127 (after 1876) +. *Ferula Narthex*, Boiss., Fl. Orient., ii, p. 994 (1872) +.

The synonymy of this plant is one of the most difficult to unravel of all in the Pharmacopœia. According to B. & H., Narthex falls into Ferula. If there were no doubt as to Linné's plant, we should be compelled to adopt his name, given above with a query; and this may be determined upon later. But while Hugh Falconer declares that specimens of the true asafœtida plant which he studied were identical with the plate of Kaempfer and the specimens on which it was based, the foundation of Linné's name, Boissier is equally certain that that figure and specimen refer to a different plant from that which yields asafœtida, and that a new name must be found for the latter. Bunge's name "fœtida" seems sufficiently distinct from "asafœtida" to stand in the same genus with it, and it is many years older than Boissier's name Narthex. I therefore propose that it be adopted, but do so with some doubt, and shall be very glad to be enlightened further on this subject.

ASCLEPIAS.—From *Asclepias tuberosa*, L., Sp. Pl., ed. 1, p. 217 (1753) +.

ASPIDIUM.—It would seem that the proper name for this genus is Dryopteris, but I have not yet had time to study out the synonymy of the species.

AURANTII AMARI CORTEX.—From *Citrus vulgaris*, Risso, Ann. de Mus., xx, p. 190 (1813), *fide* B. & T.

Synonym: *C. aurantium*, L. p. p.

AURANTII DULCIS CORTEX.—From *Citrus Aurantium*, L., Sp. Pl., ed. 1, p. 782 (1753), p. p. +.

It has been agreed that a change made in an author's description by a subsequent author shall not cause the original author's name to cease to be cited. The name must therefore be considered as Linné's.

AZEDARACH.—From *Melia Azedarach*, L., Sp. Pl., ed. 1, p. 384 (1753) +.

BALSAMUM PERUVIANUM.—From *Toluifera Pereiræ* (Royle) Baill., Hist. Pl., ii, p. 383 (1870) +.

Synonym: *Myrospermum Pereiræ*, Royle (1853), *fide* B. & T.

BALSAMUM TOLUTANUM.—From *Toluifera balsamum*, L., Sp. Pl., ed. 1, p. 384 (1753) +.

Synonym: *Myroxylon Toluifera*, Kunth, Nov. Gen. 6, p. 375, *fide* DC., Prod.

BELLADONNÆ FOLIA ET RADIX.—From *Atropa Belladonna*, L., Sp. Pl., ed. 1, p. 181 (1753) +.

BENZOINUM.—From *Styrax Benzoin*, Dryander, Philos. Trans., lxxvii, p. 308 (1787), *fide* B. & T.

BRAYERA.—From *Hagenia Abyssinica*, (Bruce) Gmelin, Syst. (1791), *fide* B. & T.

Synonym: *Bankesia Abyssinica*, Bruce (1790). But in 1776, Forster had made a Bankesia, so Bruce's name is untenable.

Other names were proposed much later than the one here adopted.

BRYONIA.—From *Bryonia alba*, L., Sp. Pl., ed. 1, p. 1012 (1753) +. And from *B. dioica*, L., Jacq., Fl. Austr., ii, p. 59 (1774) +.

BUCHU.—From *Barosma betulina* (Thunb.), Bartl. & Wendl., Beitr. z. Bot. Diosm., p. 102 (1824), *fide* B. & T.

Synonym: *Diosma betulina*, Thunb., Fl. Cap., 2, 139 (1807–13), *fide* DC., Prod.

And from *B. crenulata* (L.), Hook., Bot. Mag., t. 3413 (1835) +. This is another name about which there is some doubt, but, as I have no access to the specimens, I dare not go farther than to cite as above.

Long Buchu is from *B. serratifolia*, (Curt.), Willd., Enum. Pl., p. 257 (1809) +.

Synonym: *Diosma serratifolia*, Curtis' Bot. Mag., t. 456 (1799) +.

CAFFEINA.—From *Coffea Arabica*, L., Sp. Pl., ed. 1, p. 172 (1753) +. And from *Thea Sinensis*, L., l. c., p. 515 +.

Synonym: *Camellia Thea*, Link, En. Pl. Hort. Ber., ii, p. 73 (1822), *fide* B. & T. Concerning this name the first point is that, following B. & H., we cannot maintain both Thea and Camellia. Upon the selection of one of these names we find that Thea was Linné's genus No. 668 (+), and Camellia was his genus No. 848 (+). The former, therefore, must stand. In any case Link's specific name would be wrong, as we should be compelled to adopt the specific name of Linné.

CALAMUS.—From *Acorus Calamus*, L., Sp. Pl., ed. 1, p. 324 (1753) +.

CALENDULA.—From *Calendula officinalis*, L., Sp. Pl., ed. 1, p. 921 (1753) +.

CALUMBA.—From *Jateorhiza palmata*, (Lam.), Miers, per Hooker in Fl. Nig., p. 214 (1849) +.

Synonym: *Menispermum palmatum*, Lamarck, Dict., iv, p. 99 (1797) +. *M. Calumba*, Roxb., Fl. Ind., iii, p. 807 (1832) *fide* Pfeiffer, Nom. The specific name palmatum is thus very much older. But even those who do not adhere to this principle cannot adopt the name Calumba, for Miers proposed two species, *M. palmata* and *M. Calumba* (now accepted as identical), and the name palmata appeared first upon the page.

CAMBOGIA.—From *Garcinia Hanburii*, Hook. f., Journ. Linn. Soc., xiv, p. 485 (1875) +. By printing this name here it is not intended to endorse it, for it seems to be wrong. Hanbury regarded the plant as a mere variety, and called it var. pedicellata, and it is not at all improbable that he is correct. But, if raised to specific rank, the name should be *Garcinia pedicellata*, (Hanbury)—the presence in the genus of the name *pedunculata* apparently not preventing. But I have no means of deciding if the species be a good one or not.

CAMPHORA.—From *Cinnamomum Camphora*, (L.), Nees et Eberm., Handb. d. Med.-Pharm. Bot., i, p. 430 (1830) *fide* B. & T.

Synonym: *Laurus Camphora*, L., Sp. Pl., ed. 1, p. 369 (1753) +.

CANNABIS INDICA.—From *Cannabis sativa*, L., Sp. Pl., ed. 1, p. 1027 (1753) +.

CAPSICUM.—From *Capsicum fastigiatum*, Blume, Bijdr. Fl. Med. Ind., p. 705 (1825), *fide* B. & T.

Synonym: An older name was *C. minimum*, Roxb. (1824?), but this name had already been appropriated for a different species by Miller in R. & S. Syst. (1819).

CARDAMOMUM.—From *Elettaria repens* (Sonn.).

Synonyms: *Amomum repens*, Sonnerat, Voy. Ind., ii, p. 240 (1782), *fide* Maton. *Elettaria Cardamomum*, Maton, Trans. Linn. Soc. x, p. 254 (1811) +. Maton had no authority to substitute a new specific name for that which Sonnerat had used.

CARUM.—From *Carum Carvi*, L., Sp. Pl., ed. 1, p. 263 (1753) +.

CARYOPHYLLUM.—From *Eugenia aromatica*, (L.), O. Kunze, Rev. Gen. Pl., p. 239 +.

Synonyms: *Caryophyllus aromaticus*, L., Sp. Pl., ed. 1, p. 515 (1753) +. *Eugenia caryophyllata*, Thunb., Diss. de Caryoph. Arom., p. 4 (1788), *fide* B. & T. Thunberg here displaces Linné's name without authority.

CASCARILLA.—From *Croton Eleuteria*, (L), Bennett, Journ. Linn. Soc. iv, p. 29 (1859) +.

Synonym: *Clutia Eleuteria*, L., Sp. Pl., ed. 1, p. 1042 (1753) +.

CASSIA FISTULA.—From *Cassia Fistula*, L., Sp. Pl., ed. 1, p. 377 (1753) +.

CASTANEA.—From *Castanea dentata*, (Marsh.), Sudworth, Bull. Torr. Bot. Club, xix, p. 154 (1892) +.

Synonyms: *Fagus Castanea dentata*, Marshall, Arb. Am., p. 46 (1785) *fide* Sudworth All other names applied to this tree were later.

CATECHU.—From *Acacia Catechu*, (L. f.), Willd., Sp. Pl., iv, p. 1079 (1805) +.

Synonym: *Mimosa Catechu*, L. f., Suppl., p. 439 (1781) +.

CAULOPHYLLUM.—From *Caulophyllum thalictroides*, (L.), Mx., Fl. N. A., i, p. 205 (1820) +.

Synonym: *Leontice thalictroides*, L., Sp. Pl., ed. 1, p. 312 (1753) +.

CETRARIA.—From *Cetraria Islandica*, Acharius. This name I have not studied.

CHELIDONIUM.—From *Chelidonium majus*, L., Sp. Pl., ed. 1, p. 505 (1753) +.

CHENOPODIUM.—From *Chenopodium anthelminticum*, L., Sp. Pl., ed. 1, p. 220 (1753) +. This seems a good species.

CHIMAPHILA.—From *Pseva umbellata*, (L.), O. Kunze, Rev. Gen. Pl., p. 390 (1891) +.

Synonyms: *Pyrola umbellata*, L., Sp. Pl., ed. 1, p. 396 (1753) +.

The generic name Pseva was assigned by Rafinesque in 1809 (Obs. ex. Journ. Phys., 89, p. 26). Chimaphila, Pursh, did not appear until 1814.

CHIRATA.—From *Swertia Chirata*, Ham., Wall. Pl. As. Rar., iii., t. 252 (1832), *fide* Hook., Fl. Brit. Ind.

Synonyms: *Gentiana Chirayata*, Roxb., Fl. Ind., ii., p. 70 (1832), *fide* Hook., Fl. Brit. Ind. *Ophelia Chirata*, Griseb., Gen. & Sp. Gen., p. 320 (1829), *fide* Hook., Fl. Brit. Ind. Referred by B. & H. to Swertia.

CHONDRUS.—From *Chondrus crispus*, Lyngbye and *C. mamillosus*, Greville (I have not studied these names.)

CHRYSAROBINUM.—Up to the present time I have not been able to verify the name given in the U. S. P., *Andira Araroba*, Aguiar. I shall give further study to this name.

CIMICIFUGA.— From *Tha lictrodes racemosum*, (L.), O. Kunze, Rev. Gen. Pl. 4, (1891) +.

Synonyms: *Actæa racemosa*, L., Sp. Pl., ed. 1, p. 504 (1753). The genus Thalictrodes was established in 1739 (Amm. Stirp. Rar.), while Linné did not propose the name Cimicifuga until 1750.

CINCHONA.—There is no doubt that the proper name of this genus is Quinquina. The arrangement of the specific names will require more time than I have at present.

CINNAMOMUM. — 1. Ceylon Cinnamon. From *Cinnamomum zeylanicum*, Breyne, Ephem. Acad. Nat. Cur., Dec. 1, Ann. 4, p. 139, 140 (ex Hayne), *fide* B. & T. 2. Cassia, from *C. Cassia*, Blume, Bijdr. Fl. Neder. Ind., ii, p. 570 (1825–'26), *fide* B. & T.

COLCHICI RADIX ET SEMEN.—From *Colchicum autumnale*, L., Sp. Pl., ed. 1, p. 341 (1753) +.

COLOCYNTHIS.—From *Colocynthis vulgaris*, Schrad., Ind. Sem. h. Gott. (1833), *fide* O. Kunze.

Synonym: *Citrullus Colocynthis*, Schrad., Linnæa, xii., p. 414 (1838), *fide* O. Kunze.

Colocynthis was established in 1745 by Hall, in Rupp. Fl. jen., p. 46, while Citrullus of Forsk. did not appear until 1775 (Fl. Aeg. Arab., p. 167).

CONIUM.—From *Conium maculatum*, L., Sp. Pl., ed. 1, p. 243 (1753) +.

COPAIBA.—From *Copaiba Langsdorffii*, (Desf.), O. Kunze, Rev. Gen. Pl., p. 172 (1891) +.

Synonym: *Copaifera Langsdorffii*, Desf., Mem. Mus. d'Hist. Nat., vii, p. 377 (1821), *fide* O. Kunze.

The generic records are as follows:

Copaiba, Mill., Gard. Dict. (1739) +.

Copaiva, L., Mat. Med. (1749), *fide* O. Kunze.

Copaifera, L., Gen. (1762), *fide* O. Kunze.

CORIANDRUM.—From *Coriandrum sativum*, L., Sp. Pl., ed. 1, p. 256 (1753) +.

CORNUS.—From *Cornus florida*, L., Sp. Pl., ed. 1, p. 117 (1753) +.

CROCUS.—From *Crocus sativus*, L., Sp. Pl., ed. 1, p. 36 (1753) +.

CUBEBA.—From *Piper Cubeba*, L. f., Suppl., p. 90 (1781) +. Benth. & Hook. do not maintain Cubeba as generically distinct from Piper.

CYDONIUM.—From *Pyrus Cydonia*, L., Sp. Pl., ed. 1, p. 480 (1753). Benth. & Hook. do not maintain Cydonium as generically distinct from Pyrus.

CYPRIPEDIUM.—From *Cypripedium pubescens*, Sw., Act. Ac. Holm (1810), *fide* Torrey, Fl. N. Y. And from *C. parviflorum*, Salisb., Linn. Trans. 1, p. 77, t. 2, f. 2, *fide* Torrey, Fl. N. Y.

DIGITALIS.—From *Digitalis purpurea*, L., Sp. Pl., ed. 1, p. 621 (1753) +.

DULCAMARA.—From *Solanum Dulcamara*, L., Sp. Pl., ed. 1, p. 185 (1753) +.

ELATERINUM.—From *Ecballium Elaterium*, (L.), Rich., Dict. Class. d'Hist. Nat., vi, p. 19 (1825), *fide* B. & T.

Synonym: *Momordica Elaterium*, L., Sp. Pl., ed. 1, p. 1010 (1753) +.

ERGOTA.—This name I have not studied.

ERYTHROXYLON.—From *Erythroxylon Coca*, Lam., Dict. ii, p. 393 (1786) +.

EUCALYPTUS.—From *Eucalyptus globulus*, Labillardière, Voy. Rich. de la Perouse, i, p. 153 (1799), *fide* DC. Prod.

EUONYMUS.—From *Euonymus atropurpureus*, Jacq., Hort. Vind., ii, t. 120 (1762), *fide* DC., Prod.

EUPATORIUM.—From *Eupatorium perfoliatum*, L., Sp. Pl., ed. 1, p. 838 (1753) +.

FICUS.—From *Ficus Carica*, L., Sp. Pl., ed. 1, p. 1059 (1753) +.

FŒNICULUM.—From *Fœniculum Fœniculum* (L.), Britton, Ms.

Synonym: *Anethum Fœniculum*, L., Sp. Pl., ed. 1, (1753) +. *Fœniculum capillaceum*, Gilib., Fl. Lithuan., iv, p. 40 (1782), *fide* B. & T.

FRANGULA.—*Rhamnus Frangula*, L., Sp. Pl., ed. 1, p. 193 (1753) +.

GALBANUM.—The facilities at my disposal have not allowed me to come to a decision as to the species yielding this drug.

GALLA.—From *Quercus lusitanica*, Lamarck, Dict. i., p. 719 (1783) +.

GAULTHERIA.—This name would appear to be *Brossæa procumbens*, (L.), O. Kunze, Rev. Gen. Pl., p. 388 (1891) +.

Synonym: *Gaultheria procumbens*, L., Sp. Pl., ed. 1 (1753), *fide* Richter.

In 1737 Linné established the genus Brossæa, while his name Gaultheria did not appear until 1751. His Brossæa applied to *B. coccinea*. It is claimed that this plant is generically identical with our Gaultheria. If this is correct, then Brossæa applies also to our plant.

GELSEMIUM.—From *Gelsemium sempervirens*, (L.), Pers., Ench., i, p. 267, n. 611 (1805), *fide* Pfeiffer. *Bignonia sempervirens*, L., Sp. Pl., ed. 1, p. 623 (1753) +.

GENTIANA.—From *Gentiana lutea*, L., Sp. Pl., ed. 1, p. 227, (1753) +.

GERANIUM.—From *Geranium maculatum*, L., Sp. Pl., ed. 1, p. 681 (1753) +.

GLYCYRRHIZA.—From *Glycyrrhiza glabra*, L., Sp. Pl., ed. 1, p. 742 (1753) +.

GOSSYPIUM.—From *Gossypium herbaceum*, L., Sp. Pl., ed. 1 (1753) +.

GRANATUM.—From *Punica Granatum*, L., Sp. Pl., ed. 1, p. 427 (1753) +.

GRINDELIA.—From *Grindelia robusta*, Nutt., Trans. Am. Phil. Soc., vii, p. 314 (1841) +.

GUAIACI LIGNUM.—From *Guaiacum officinale*, L., Sp. Pl., ed. 1, p. 281 (1753) +. And from *G. sanctum*, L., l. c., p. 382 +.

GUARANA.—From *Paullinia sorbilis*, Mart., Reise in Brasil., Spix and Mart., iii, p. 1098 (1831), *fide* B. & T.

GUTTA PERCHA.—From *Dichopsis Gutta*, (Hook.), Bentl. & Trin., No. 16 +. I follow B. & H. in taking the genus to be Dichopsis.

HÆMATOXYLON.—From *Hæmatoxylon Campechianum*, L., Sp. Pl., ed. 1, p. 384 (1753) +.

HAMAMELIS.—From *Hamamelis Virginica*, L., in Nat., 333, *fide* DC.

HEDEOMA.—From *Hedeoma pulegioides*, (L.), Pers., Syn. Pl., ii, p. 131 (1867) +.

Synonym: *Cunila pulegioides*, L., Sp. Pl., ed. 2, p. 30, (1762) +.

HUMULUS.—From *Humulus Lupulus*, L., Sp. Pl., ed. 1, p. 1028 (1753) +.

HYDRASTIS.—From *Hydrastis Canadensis*, L., Syst. Nat., ed. 10, p. 1088 (1758 to 1759) +.

The genus Hydrastis dates from 1737 +.

HYOSCYAMUS.—From *Hyoscyamus niger*, L., Sp. Pl., ed. 1, p. 179 (1753) +.

IGNATIA.—From *Strychnos Ignatia*, Berg., Mat. Med., i, p. 146 (1778) *fide* B. & T.

ILLICIUM.—From *Illicium anisatum*, L., Sp. Pl., ed. 2, p. 664 (1762) +.

The genus Illicium appears in the Gen. Pl. (1737), No. 611.

INULA.—From *Inula Helenium*, L., Sp. Pl., ed. 1, p. 881 (1753) +.

The genus Inula appears in the Gen. Pl. (1737), No. 956.

IPECACUANHA.—From *Cephaelis emetica*, Pers., Syn. Pl., i, p. 203, (1805) +.

Synonym: *Cephaelis Ipecacuanha*, A. Rich., Hist. Nat. Ip., p. 21 (1820), *fide* B. & T.

IRIS.—From *Iris versicolor*, L., Sp. Pl., ed. 1, p. 39 (1753) +.

JALAPA.—Benth. & Hook. suppress the genus Exogonium. This, therefore, becomes Ipomœa. I. jalapa, Don, was published in 1838. I. Purga, Hayne, was published in Arzn. Gew. xii, t. 33 and 34 (*fide* Hemsley), between 1805 and 1846. I have no means of ascertaining the exact date, so cannot decide which name is the older.

JUGLANS.—From *Juglans cinerea*, L., Sp. Pl., ed. 2, p. 1415 (1762) +.

JUNIPERUS.—From *Juniperus communis*, L., Sp. Pl., ed. 1, p. 1040 (1753) +.

KAMALA.—From *Mallotus Philippinensis*, (Lamarck,) Müll. Arg., Linnæa, xviii, p. 196 (1865) +.

Synonym: *Croton Philippense*, Lam., Encyc., ii, p. 206 (1786) +.

KINO.—From *Lingoum Marsupium*, (Roxb.), O. Kunze, Rev. Gen. Pl., p. 193 (1891) +.

Synonym: *Pterocarpus Marsupium*, Roxb., Pl. Corom., ii, p. 9 (1798), *fide* B. & T.

Linné's Pterocarpus here used by Roxburgh was published in 1763, and was antedated by another application of this name, by Linné himself, in 1747, for the genus now called Derris. In 1742, Rumph (ii, p. 205, t. 70 +) had applied the name Lingoum to the genus of Kino, and this name must stand.

KRAMERIA.—From *Krameria triandra*, R. & P., Fl. Per., i, p. 61 (1798) +, and from *K. Ixina*, L., Sp. Pl., ed. 2, p. 177 (1762) +.

Synonym: *K. tomentosa*, St. Hil., Expos., ii, p. 346 (1805), *fide* Pfeiffer.

LACTUCARIUM.—From *Lactuca virosa*, L., Sp. Pl., ed. 1, p. 795 (1753) +.

LAPPA.—From *Arctium Lappa*, L., Sp. Pl., ed. 1, p. 816 (1753) +.

LAVANDULA.—From *Lavandula officinalis*, Chaix, Vill. Dauph., p. 355 (1786), *fide* DC., Fl. Fr.

Synonym: *L. vera*, DC., Fl. Fr., Suppl., p. 398 (1815) +.

LEPTANDRA.—From *Veronica Virginica*, L., Sp. Pl., ed. 1, p. 9 (1753) +.

LIMONIS CORTEX, ETC.—From *Citrus Limonum*, Risso, Ann. de Mus., xx, p. 201 (1813), *fide* B. & T.

LINUM.—From *Linum usitatissimum*, L., Sp. Pl., ed. 1, p. 277 (1753) +.

LOBELIA.—From *Lobelia inflata*, L., Act. Ups., p. 23 (1741) *fide* B. & T.

LYCOPODIUM.—From *Lycopodium clavatum*, L., Sp. Pl., ed. 1, p. 2101 (+) and from other species.

MACIS (AND MYRISTICA).—From *Palala fragrans*, (Houttuyn), O. Kunze, Rev. Gen. Pl., p. 567 (1891) +.

Synonym: *Myristica fragrans*, Houtt., Hyst. Nat., ii, part 3, p. 233 (1774), *fide* B. & T.

Palala is from 1741 (Rumph, Herb. Amb., Vol. 2, p. 28 +).

Myristica is from 1742 (L., Gen. Pl., ed. 2, p. 524 +).

MAGNOLIA.—From *Magnolia Virginiana*, L., Sp. Pl., ed. 1, p. 535 (1753) +.

Synonym: *Magnolia glauca*, L., Sp. Pl., ed. 2, p. 755 (1762) +. In his first edition Linné divided his *M. Virginica* up into several varieties, of which the first or type variety was var. glauca. In his second edition he raised these varieties to species, but in taking as the specific name of each the name that it had held as a variety, he entirely

suppressed the specific name "Virginiana," which was really the first name printed and which, in my judgment, must be reserved for his type variety as above.

And from *M. acuminata*, L., Sp. Pl., ed. 2, p. 756 (1762) +.

And from *M. tripetala*, L., l. c., +.

MALTUM.—From *Hordeum vulgare*, L., Sp. Pl., ed. 1, p. 84 (1753) +.

Synonym: *H. distichum*, L., l. c., p. 85 +.

MANNA.—From *Fraxinus Ornus*, L., Sp. Pl., ed. 1, p. 1057 (1753) +.

MARRUBIUM.—From *Marrubium vulgare*, L., Sp. Pl., ed. 1, p. 583 (1753) +.

MASTICHE.—From *Pistacia Lentiscus*, L., Sp. Pl., ed. 1, p. 1026 (1753) +.

MATICO.—From *Piper angustifolium*, R. & P., Fl. Per., i, p. 38 (1798) +.

MATRICARIA.—From *Matricaria Chamomilla*, L., Sp. Pl., ed. 1, p. 891 (1753) +.

MELISSA.—From *Melissa officinalis*, L., Sp. Pl., ed. 1, p. 592 (1753) +.

MENISPERMUM.—From *Menispermum Canadense*, L., Sp. Pl., ed. 1, p. 340 (1753) +.

MENTHA PIPERITA.—From *Mentha piperita*, Smith, Trans. Linn. Soc., v, p. 189 (1800) +.

MENTHA VIRIDIS.—From *Mentha viridis*, L., Sp. Pl., ed. 2, p. 804 (1762) +.

MEZEREUM.—From *Daphne Mezereum*, L., Sp. Pl., ed. 1, p. 356 (1753) +.

MYRRHA.—From *Commiphora Myrrha*, (Nees).

Synonym: *Balsamodendron Myrrha*, Nees, Pl. Offic. (1821–1833), *fide* B. & T. Balsamodendron, Kunth, dates from 1824, while Commiphora, Jacq., was established in 1797 (Hort. Schoenb., ii, p. 267, t. 249 (1797).

OLEUM CAJUPUTI.—From *Myrtoleucodendron minor*, (Smith).

Synonyms: *Melaleuca minor*, Smith, Rees' Cyclop., xxiii. (1813), *fide* B. & T.

Melaleuca Cajuputi, Roxb., Fl. Ind., iii., p. 394 (1832), *fide* Lindley, Fl. Med.

The generic name Melaleuca was not given by Linné until 1767, while Rumph (Herb. Amb., ii, p. 72 +.) had established Myrtoleucodendron in 1742.

As to the specific name, O. Kunze (Rev. Gen. Pl., p. 241, (1891 +.) calls it *Myrtoleucodendron viridiflorum*, (Gærtn.) If Gærtner's plant is really identical with Smith's *M. minor*, then Kunze's name must be adopted; but I have no means of ascertaining this, and am not willing to accept Kunze's judgment on a point of this kind, in opopsition to that of DeCandolle.

NUX VOMICA.—From *Strychnos Nux-vomica*, L., Sp. Pl., ed. 1, p. 189 (1753) +.

OLEUM BERGAMII.—From *Citrus Bergamia*, Risso et Poit., Hist. Orang., p. 111, (1818), *fide* B. & T.

OLEUM ERIGERONTIS.—From *Erigeron Canadense*, L., Sp. Pl., ed. 1, p. 863 (1753) +.

OLEUM MYRCIÆ.—From a species of Myrcia which should be called either *M. caryophyllata* (Jacq.) or *M. racemosa* (Miller). Between 1764 and '71, Jacquin (Obs., 2, p. 1) had called it *Myrtus caryophyllatus;* but I am not able to decide if this name is older than *Caryophyllus racemosus*, Miller; *Myrcia acris*, Swartz, of the present edition, did not appear until 1788; but until we can decide which of the above names is the older, it is not worth while to make a change.

OLEUM OLIVÆ.—From *Olea Europæa*, L., Sp. Pl., ed. 1, p. 8 (1753) +.

OLEUM RUTÆ.—From *Ruta graveolens*, L., Sp. Pl., ed. 1, p. 383 (1753) +.

OLEUM SESAMI.—From *Sesamum Indicum*, L., Sp. Pl., ed. 1, p. 634 (1753) +.

OLEUM THEOBROMÆ.—From *Theobroma Cacao*, L., Sp. Pl., ed. 1, p. 782 (1753) +.

OLEUM THYMI.—From *Thymus vulgaris*, L., Sp. Pl., ed. 1, p. 591 (1753) +.

OLEUM TIGLII.—From *Croton Tiglium*, L., Sp. Pl., ed. 1, p. 1004 (1753) +.

OPIUM.—From *Papaver somniferum*, L., Sp. Pl., ed. 1, p. 508 (1753) +.

ORIGANUM.—From *Origanum vulgare*, L., Sp. Pl., ed. 1, p. 590 (1753) +.

PAREIRA.—From *Chondodendron tomentosum*, R. & P., Syst. Fl. Per. et Chil., p. 261 (1798), *fide* Fl. Bras.

PEPO.—From *Cucurbita Pepo*, L., Sp. Pl., ed. 1, p. 1010 (1753) +.

PHYSOSTIGMA.—From *Physostigma venenosum*, Balfour, Trans. Roy. Soc. Edinb., xxii, p. 310 (1861), *fide* B. & T.

PHYTOLACCÆ BACCÆ et RADIX.—From *Phytolacca decandra*, L., Sp. Pl., ed. 2, p. 631 (1762) +.

PICROTOXINUM.—From *Anamirta paniculata*, Colebrooke, Trans. Linn. Soc., xiii, p. 66 (1822) +.

PILOCARPUS.—This name is correct in present edition of U. S. P., according to recent article by J. D. Hooker in Bot. Mag.

PIMENTA.—From *Pimenta officinalis*, Lindl., Coll. Bot. sub. t. 19 (1821) *fide* B. & H., who maintain this genus.

PIPER.—From *Piper nigrum*, L., Sp. Pl., ed. 1, p. 28 (1753) +.

PIX BURGUNDICA.—From *Abies Abies*, (L.).

Synonym: *Pinus Abies*, L., Sp. Pl., ed. 1, p. 1002 (1753) +.

PIX CANADENSIS.—From *Tsuga Canadensis*, (L.) Carr., Traité Conif., p. 189 (1855), *fide* Sargent.

Synonym: *Pinus Canadensis*, L., Sp. Pl., ed. 2, p. 1421 (1762) +.

PODOPHYLLUM.—From *Podophyllum peltatum*, L., Sp. Pl., ed. 2, p. 505 (1753) +.

PRINOS.—From *Ilex verticillata*, (L.), Gray, Man., ed. 2, p. 264 (1856) +.

Synonym: *Prinos verticillata*, L., Sp. Pl., ed. 1, p. 330 (1753) +.

PRUNUM.—From *Prunus domestica*, L., Sp. Pl., ed. 1, p. 475 (1753) +.

PRUNUS VIRGINIANA.—From *Prunus serotina*, Ehrh., Beitr, z, Natur., iii, p. 20 (1788), *fide* Wats. Bib Ind.

PULSATILLA.—From *Anemone Pulsatilla*, L., Sp. Pl., ed. 1, p. 539 (1753) +.

And from *A. pratensis*, L., l. c.

And from *A. hirsutissima*, (Pursh).

Synonym: *Clematis hirsutissma*, Pursh. Fl. Am. Sept., 385 (1814) +.

PYRETHRUM.—From *Anacyclus Pyrethrum* (L.) DC., Fl. Fr., vi, p. 480 (1815) +.

Synonym: *Anthemis Pyrethrum*, L., Sp. Pl., ed. 1, p. 895 (1753) +.

QUASSIA.—From *Picræna excelsa* (Sw.) Lindl., Fl. Med., p. 208 (1838) +.

Synonym: *Quassia excelsa*, Sw., Act. Holm. p. 302, t. viii, (1788), *fide* Sw. in Fl. Ind. Occ., iii, p. 742.

*Q. polygama*, Lindsay, Act. Edinb., iii, p. 205. (I have been unable to verify this citation, or to learn its year. It may be that "polygama" is older than "excelsa.")

QUERCUS ALBA.—From *Quercus alba*, L., Sp. Pl., ed. 1, p. 996 (1753) +.

QUILLAIA.—From *Quillaia saponaria*, Molina, Comp. Hist. Nat. d. Chil., ed. 1, p. 175 (1782), *fide* Phillippi, Comment. Mol.

RHEUM.—From *Rheum officinale*, Baillon, Adansonia, p. 246 (1872), *fide* B. & T.

RHUS GLABRA.—From *Rhus glabra*, L., Sp. Pl., ed. 1, p. 265 (1753) +.

RHUS TOXICODENDRON.—From *Rhus radicans*, L., Sp., Pl., ed. 1, p. 266 (1753) +.

ROSA CENTIFOLIA.—From *Rosa centifolia*, L., Sp. Pl., ed, 1, p. 491 (1753) +.

ROSA GALLICA.—From *Rosa Gallica*, L., Sp. Pl., ed. 1, p. 492 (1753) +.

ROSMARINUS.—From *Rosmarinus officinalis*, L., Sp. Pl., ed. 1, p. 23 (1753) +.

RUBUS.—From *Rubus villosus*, Ait., Hort. Kew., ii, p. 210 (1789) +.

And from *R. Canadensis*, L., Sp. Pl., ed. 1, p. 494 (1753) +.

And from *R. trivialis*, Mx., Fl., i, p. 296 +.

RUBUS IDÆUS.—From *Rubus idæus*, L., Sp. Pl., ed. 1, p. 492 (1753) +.

RUMEX.—From *Rumex crispus*, L., Sp. Pl., ed. 1, p. 335 (1753) +.

SABINA.—From *Juniperus Sabina*, L., Sp. Pl., ed. 1, p. 1039 (1753) +.

SALICINUM.—From *Salix Helix*, L., Sp. Pl., ed. 1, p. 1017 (1753) +. (And other species.)

SALIX.—From *Salix alba*, L., Sp. Pl., ed. 1, p. 1021 (1753) +.

SALVIA.—From *Salvia officinalis*, L., Sp. Pl., ed. 1, p. 23 (1753) +.

SAMBUCUS.—From *Sambucus Canadensis*, L., Sp. Pl., ed. 1, p. 269 (1753) +.

SANGUINARIA.—From *Sanguinaria Canadensis*, L., Sp. Pl., ed. 1, p. 505 (1753) +.

SANTALUM RUBRUM.—From *Lingoum santalinum*, (L. f.), O. Kunze, Rev. Gen. Pl., p. 193 (1891) +.

Synonym: *Pterocarpus santalinus*, L. f., Suppl. Pl., p. 318 (1781) +.

(See Kino for remarks.)

SANTONICA.—From *Artemisia pauciflora*, Weber, Stechm. de Artem., p. 26 (1775), *fide* B. & T.

SARSAPARILLA.—From *Smilax officinalis*, Kunth, Humb. et Bonp., Nov. Gen. et Sp., i., p. 271 (1815), *fide* B. & T.

And from *S. medica*, Schlecht. et Cham., Linnæa, vi, p. 47 (1831) +.

SASSAFRAS.—From *Sassafras Sassafras*, (L.).

Synonym: *Laurus Sassafras*, L., Sp. Pl., ed. 1, p. 371 (1753) +.

O. Kunze, who does not resort to duplicate names, calls it *S. variifolia* (Salisb.). (*Laurus variifolia*, Salisb., Prod., p. 344, 1796.)

SCAMMONIUM.—From *Convolvulus Scammonium*, L., Sp. Pl., ed. 1, p. 55 (1753).

SCILLA.—From *Urginea maritima*, (L.), Baker, Jour. Linn. Soc., xiii., p. 221 (1873) +.

Synonyms: *Scilla maritima*, L., Sp. Pl., ed. 1, p. 308 (1753) +.

*Urginea Scilla*, Steinheil, Ann. Sci. Nat., Ser. 2, i., p. 330 (1834) +.

SCOPARIUS.—From *Cytisus scoparius*, (L.), Link, Enum., ii, p. 241 (1822) +.

Synonyms: *Spartium scoparium*, L., Sp. Pl., ed. 1, p. 709 (1753) +.

*Sarothamnus scoparius*, Koch, Syn. Fl. Ger. et Helv., ed. 1, p. 152 (1837) *fide* ed. 2.

I follow B. & H. in referring it to Cytisus.

SCUTELLARIA.—From *Scutellaria lateriflora*, L., Sp. Pl., p. 598 (1753) +.

SENEGA.—From *Polygala Senega*, L., Sp. Pl., ed. 1, p. 704 (1753) +.

SENNA.—(1) From *Cassia acutifolia*, Fl. de l' Ægypt., ii, p. 219 (1812), *fide* B. & T.

(2) From *Cassia angustifolia*, Vahl, Symb. Bot., i, p. 29 (1790), *fide* B. & T.

Synonym: *Cassia elongata*, Lemaire-Lisancourt, Journ. Pharm., vii, p. 345, *fide* Lindley, Fl. Med.

SERPENTARIA.—From *Aristolochia Serpentaria*, L., Sp. Pl., ed. 1, p. 961 (1753) +.

And from *A. reticulata*, Nutt., Trans. Am. Phil. Soc., v, p. 162 (1839) +.

SINAPIS ALBA.—From *Brassica alba*, (L.), Hook. f. et Th., Fl. Brit. Ind., i, p. 157 (1872) —.

Synonym: *Sinapis alba*, L., Sp. Pl., ed. 1, p. 668 (1753) +.

I believe Sinapis to be a genus distinct from Brassica; but if we follow B. & H. we must class it as Brassica.

SINAPIS NIGRA.—From *Brassica nigra* (L.), Koch, Deutschl. Fl., iv, p. 713 (1833) +.

Synonym: *Sinapis nigra*, L., Sp. Pl., ed. 1, p. 668 (1753) +.

SPIGELIA.—From *Spigelia Marilandica*, L., Syst. Nat., ed. 12, ii, p. 734 (1767) +.

STAPHISAGRIA.—From *Delphinium Staphisagria*, L., Sp. Pl., ed. 1, p. 521 (1753) +.

STILLINGIA.—From *Stillingia sylvatica*, L., Mant., p. 126 (1767) +.

STRAMONIUM.—From *Datura Stramonium*, L., Sp. Pl., ed. 1, p. 189 (1753) +.

STYRAX.—From *Liquidambar orientalis*, Miller, Gard. Dict., ed. 8 (1768) +.

SUMBUL.—From *Ferula Sumbul*, (Kaufm.), Hook. f., Bot. Mag., t. 6196 (1875) +.

Synonym: *Euryangium Sumbul*, Kaufm., Nouv. Mém. Soc. Imp. d. Nat. de Mosc., xiii, p. 253 (1871) *fide* B. & T.

TABACUM.—From *Nicotiana Tabacum*, L., Sp. Pl., ed. 1, p. 180 (1753) +.

TAMARINDUS.—From *Tamarindus Indicus*, L., Sp. Pl., ed. 1, p. 34 (1753) +.

TANACETUM.—From *Tanacetum vulgare*, L., Sp. Pl., ed. 1, p. 844 (1753) +.

TARAXACUM.—From *Taraxacum Taraxacum*, (L.).

Synonym: *Leontodon Taraxacum*, L., Sp. Pl., ed. 1, p. 298 (1753) +.

TEREBINTHINA.—From *Pinus australis*, Mx., Sylv. N. A., ii, p. 265 (1819) +.

TEREBINTHINA CANADENSIS.—From *Abies balsamea*, (L.), Miller, Dict., 1807 +.

Synonym: *Pinus balsamea*, L., Sp. Pl., ed. 1, p. 1002 (1753) +.

THUJA.—From *Thuja occidentalis*, L., Sp. Pl., ed. 1, p. 1002 (1753) +.

TRAGACANTH.—From *Astragalus gummifer*, Labillardière, Obs. sur l. Phys., xxxvi, p. 59 (1790). *fide* B. & T.

TRITICUM.—From *Agropyrum repens* (L.), Beauv., Agrostideæ, p. 102, *fide* Kunth, Enum.

Synonym: *Triticum repens*, L., Sp. Pl., ed. 1, p. 86 (1753) +.

ULMUS.—From *Ulmus fulva*, Mx., Fl. Bor. Am., i, p. 172 (1803) +.

USTILAGO.—This name I have not studied.

UVA URSI.—From *Arctostaphylos Uva-ursi*, (L.), Sprengel, Syst. Veg., ii, p. 287 (1825) +.

Synonym: *Arbutus Uva-ursi*, L., Sp. Pl., ed. i, p. 395 (1753) +.

VALERIANA.—From *Valeriana officinalis*, L., Sp. Pl., ed. 1, p. 31 (1753) +.

VANILLA.—From *Vanilla planifolia*, Andrews, Bot. Repos., t. 538 (1808), *fide* B. & T.

VERATRINA.—From *Asagræa officinale*, (Ch. & Sch.), Lindley, Bot. Reg., xxv, (n. ser., xii), t. 33 (1839), *fide* Pfeiffer Syn.

Synonyms: *Veratrum officinale*, Ch. & Sch., Linnæa, vi, 45 (1831) +. *Schoenocaulon officinale*, Gray, Ann. Lyc. N. Y., p. 127 (1848) +. (See below, note under Schoenocaulon.)

Asagræa, Lindley, appeared in 1839.

Schoenocaulon was substituted by Gray in 1848. There was, of course, no authority for this, and the later name cannot be recognized. But, by a curious misprint, Gray's name is made to appear the older, for it appears in Plant. Hartweg., the title page of which bears the imprint 1839, which would make Gray's name nine years older than it really is. As a matter of fact, Pl. Hartweg. appeared, a little at a time, during many years, the page bearing this name appearing in 1849, one year after Gray published the name in Ann. Lyc., and ten years after Lindley had published the name Asagræa.

VERATRUM.—From *Veratrum viride*, Solander, in Ait., Hort. Kew., iii, p. 422 (1789) +.

VIBURNUM.—From *Viburnum prunifolium*, L., Sp. Pl., ed. 1, p. 268 (1753) +.

VIOLA TRICOLOR.—From *Viola tricolor*, L., Sp. Pl., ed. 1, p. 935 (1753) +.

XANTHOXYLUM.—From *Xanthoxylum Americanum*, Mill., Dict., (1807) +.

Synonym: *X. fraxineum*, Willd., Sp., iv, p. 759 (1809), *fide* Sargent, Tree Census.

And from *X. Clava-Herculis*, L., Sp. Pl., ed. 1, p. 270 (1753) pp. +.

Synonym: *X. Carolinianum*, Lam., Dict., ii, p. 39 (1786), *fide* Sargent, Tree Census.

ZINGIBER.—From *Zingiber Zingiber* (L.).

Synonyms: *Amomum Zingiber*, L., Sp. Pl., ed. 1, p. 1 (1753) +. *Zingiber officinale*, Roscoe, Trans. Linn. Soc., viii, p. 348 (1807) +.

MR. MAISCH: I would like to ask Mr. Rusby a question in regard to Illicium. I think that Hooker, some years ago, showed that Linné's *Illicium anisatum* was the *Illicium religiosum* of Siebold, and that a new name should be given to the star-anise plant. He called it *Illicium verum*, and stated that this species and *Illicium anisatum* of Linné, belonged to entirely different sections of the genus.

MR. RUSBY: I have forgotten the details about which Mr. Maisch inquires, but I studied the matter, and decided that "Illicium anisatum" is the true name. The details I cannot recall, but will endeavor to do so. I was sorry when the name was changed, because I was accustomed to the other, and believed it to be the correct one, and perfectly applicable.

MR. MAISCH: There is another question in regard to Jalapa. I remember that the jalap plant first became known in Philadelphia. Dr. John Redman Coxe procured specimens and I was under the impression that the plant had been named at that time. The reference in Dr. Rusby's paper goes back only as far as 1838, while Dr. Coxe raised that plant earlier in the present century. I do not recollect the exact year.

MR. RUSBY: This is entirely new to me. I am obliged to Mr. Maisch for mentioning it. It may be that Coxe published a name with a description, and I shall be glad to look up that point.

MR. MAISCH: If I remember correctly, a description was published in the transactions of the American Philosophical Society.*

I would add, that nobody, unless he has done similar work, knows the immense amount of labor connected with this branch of investigation. From my standpoint, I am exceedingly obliged to Professor Rusby for taking it up, for I should have despaired of ever doing that much in this line.

On motion of Mr. Ryan, a special vote of thanks was tendered Mr. Rusby for his excellent paper.

The following paper was read by the author:

## PHOSPHATE OF IRON, U. S. P., 1880, AND PHOSPHORIC ACID.

BY LUTHER T. STEVENS, BROOKLYN.

The following prescriptions coming under my hand some time ago within a space of about twenty-four hours, each late at night, from strange physicians living in another city, and therefore giving no chance to obtain instructions other than as stated later, and brought by customers who were much excited, fearful that something wrong was likely to happen and very certain that there was immediate necessity for use of the medicine, set me at a line of experiments to determine the limit of solubilities and of final breaking up when phosphate of iron, U. S. P., 1880, and alkaloids are brought together in the presence of free phosphoric acid.

We have all suffered from the pyrophosphate craze of endeavor to make a valuable remedial do work entirely foreign to the intent of its constitution, and methods for successfully handling these unsuccessful attempts, for such they must be, have been extensively offered. Perhaps a monograph which appeared as a communication from Mr. H. P. Campbell, of New York City, in the Druggists' Circular for February, 1890, will assist any one who is in need, as it is very complete.

There seems, however, to be a general impression that the officinal phosphate is compatible under all circumstances.

Pharmacy has suffered in this case, as in others, from its wonderful plentitude and ability to meet emergencies, for we find that when we give

* This is an error: Dr. Coxe's paper was printed in February, 1830, in the *American Journal of Medical Sciences*, Vol. v. He procured living tubers from Xalapa, in 1827, and in the same year had one flower; but in 1829 had about 20 flowers. Nuttall, who had observed that the tubers would survive the winter at Cambridge, Mass., furnished the description, naming the plant *Ipomœa Jalapa*. The handsome plates of the plant give the same name with the addition *var. macrorhiza*.—EDITOR.

the prescribers an inch there is immediately a great demand for an ell. Loud were the complaints concerning true phosphate, when that was officinal, on account of its insolubility—the doctors holding that this fact hindered its therapeutic availability; but now that we have furnished two soluble phosphate salts by linking citrate of soda with the originals, and each exceedingly useful when properly handled, our second estate is worse than the first, because of this continual struggle to use them out of place, and a good thing not in its proper location becomes ungainly.

Once I asked a doctor with whom I was intimate, why he gave such quantities of pyrophosphate; he replied that it was because there was such a very small proportion of iron contained, only 11.8 per cent., necessitating the exhibition of nine or ten grains to get the effect of one grain of iron. Probably he forgot that chloride in tincture has but 13.23 per cent. and yet is seldom given in doses to equal one grain of the metal, and that the combinations in all of these compounds are what give value to the metal. Of carbonate large quantities can be given, one grain frequently repeated is an after use of iron by hydrogen, because of either comparatively little is absorbed, while citrate or the two phosphates are almost immediately broken up in the stomach and become medicinally active.

| | | |
|---|---|---|
| ℞. | Strychniæ | gr. j. |
| | Quiniæ sulph. | ʒj. |
| | Ferri phosphas | ʒj. |
| | Acid. phosphoric. dil | ℥ij. |
| | Syrup zingiberis | ℥ij. |

This was presented with a verbal order from the physician through the party bringing it "*to be sent out clear.*"

| | | | |
|---|---|---|---|
| ℞. | Strych. sulph | | gr. j. |
| | Quiniæ sulph | | ʒj. |
| | Phosphate of iron | | ʒj. |
| | Acid. phosphoric. dil | | q. s. |
| | Syr. aurantii, | | |
| | Aqua | āā | ft. ℥iv. |

This one appeared as a copy from a well known pharmacy in an adjoining city. The customer was exceedingly nervous, and, as an extra precaution, had brought the former bottle with everything intact, including directions, shake label, and a heavy white coating upon the whole inside, with repeated and particular directions to have the new lot *exactly like that which he had before.*

With a sample present, this was, of course, not difficult to perform, especially owing to protracted work upon number one on the night before; so when a package was handed to him filled with a white mush, he seemed entirely satisfied.

Either formula may be brought to a clear liquid without outside aid by

using only the medicinals to and including the fourth ingredient, and will then stand in good solution for two or three weeks before breaking up; beyond that, however, it is impossible, as almost any adjuvant, and particularly such as used here, causes an immediate chemical interchange, yielding compounds totally different from what is expected.

To obtain that clear solution, dissolve the iron scales directly in the acid; agitation is sufficient, as neither heat nor prolonged time will do more, because whether by accident or design, the quantities given are at the limit of solubility, and if extra iron is added it will crystallize out again in some twenty-four hours in the shape of light green scales, but no decomposition occurs until upon longer standing, though it will come at last. This saturated solution of citro-sodic-ferric-phosphate now acts as a solvent for the quinine or for other alkaloidal salts, as codeine, morphine, brucine, strychnine (each having been tried). All of them being best used as sulphates or hydrochlorates, more quinine can be forced in if an assortment of different salts are used, say for this given solution, sulphate 60, hydrochlorate 20, bisulphate 20, equaling 100 grains; but some of the iron salt falls again in the same green scales as just spoken of.

Trials upon these quinine forms gave the limit when used alone similar to each other, and a little in excess of the quantity stated in the prescription, the bisulphate however being the most slow in dissolving. Phosphate will go in to only one-half the amount of the other three stated, unless it is given the acid first, when the same proportion will be taken up, but then upon adding the iron one-half the requisite quantity is all that can be accommodated, more causing immediate dissociation, even worse in extent than when the original number one goes to pieces, which virtually renders quinine phosphate inappropriate for this purpose, nor are phosphates of other alkaloids any better.

When an attempt is made to bring quinine sulphate first to the acid, a partial decomposition ensues immediately, which can only be remedied by sufficient of a mineral acid to overpower the weaker phosphoric, and of course the total result by this time is a very complex compound.

The first prescription was reduced to clearness by means of dilute hydrochloric acid, a comparatively small quantity being necessary, while the inquiry was being prosecuted and relying somewhat upon statements seen in print. I had stated to friends that an excess of citric acid would perform the same work, but further experimentation proved that, as stated above, a more powerful agent was needed.

Such work as this coming to our hand means active exercise of every sense and wit. In neither of these cases did the written order show what the prescriber wished, and whatever had been done, the original intent of the combination could not have been met. By round-about methods a scheme of the immediate necessity for each was found, but evidently a set rule would not be in order when there is liability on parallel lines of

totally opposite results being desired. Thus we from force of custom must often depend as much upon environment as upon science.

It is to be supposed that this would ordinarily be expected to be clear, as that condition is the one for which we mostly work. Yet with this second customer that carried out would have been a disastrous conclusion, and if the first had been put up as written, the effect as regards the relations of the store and the family concerned would have been serious, so it is well to find out whether such an one has been put up before and in what shape, or in absence of instruction to clear it.

Quinine will build three sulphates.

The Officinal, $\left.\begin{matrix}\text{(Quinia)}\\\text{(Quinia)}\end{matrix}\right> H_2SO_4 7H_2O = 872.$

Bisulphate, $\text{(Quinia)} = H_2SO_4 7H_2O = 548.$

The proper Disulphate, $\text{(Quinia)} = (H_2SO_4)_2 7H_2O = 646.$

the last being much the more soluble in water of either.

Hydrochlorate $\text{(Quinia)—HCl } 2H_2O = 396.4.$

Phosphate $\left.\begin{matrix}\text{(Quinia)—O}\\\text{(Quinia)—O}\\\text{(Quinia)—O}\end{matrix}\right\} P = O$

A saturated salt, represented here as anhydrous and ready to combine; whether in this condition or as the market crystalline it is but slightly soluble in water, and it is said that the mono- and di- possibilities are much the same, while quinia citrate is but little better, if at all.

The white precipitate so quickly dropped when the proportions of the first prescription are carried out, upon the addition of any ordinary adjuvant, is quinia phosphate in one of the unsaturated forms possible.

Upon working out the molecular proportions it will soon be evident that these prescriptions are very close to the proper theoretical figures, and it would seem that the combination had been recommended after only partial trials, or possibly without any at all, because often conclusions are jumped at in a totally unwarranted manner.

Phosphate of iron is made by breaking up scaled citrate of iron with officinal sodium phosphate (Hydrogen-di-sodium-phosphate).

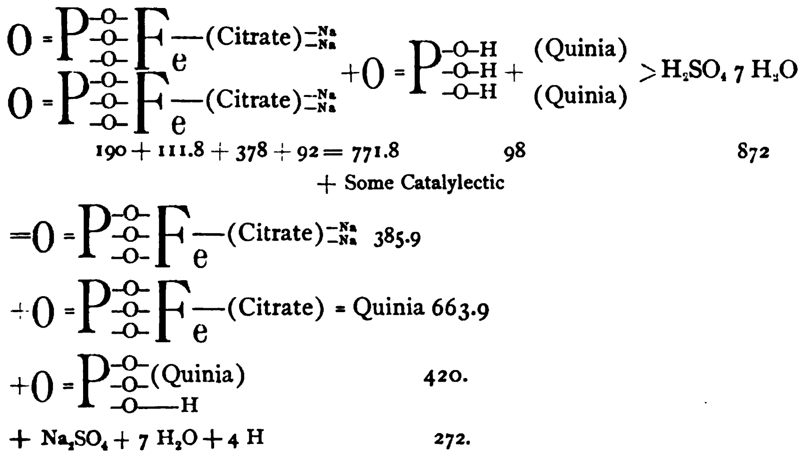
$$Fe_2(C_6H_5O_7)_2\ 6\ H_2O = 597.8 + 2\ Na\ HPO_4\ 12\ H_2O = 771.8$$
$$= 2\ FePO_4C_6H_5O_7\ Na_2\ 771.8 + 30\ H_2O + H_2O.$$

This when scaled will dissolve in diluted phosphoric acid 1 to 16; if the acid be neutralized by an alkali it will not be thrown out, but more may be added to that now alkaline solution and still hold. It is far more soluble in water at ordinary temperatures, 1 to 4 being quickly accomplished, and this will then stand sodium bicarbonate up to two-thirds the amount of iron phosphate used; but the color is changed, and of course this strongly alkali solution will break up after awhile just as the acid one will. If the alkali be potassa and heat applied to hurry the operation, a brownish-red

precipitate quickly falls, which will also be the case upon long standing when cold.

When quinine is added to the phosphoric acid already saturated with phosphate of iron, and then syrup, glycerin, tincture or water, equal in volume to the diluted acid, a complicated change occurs.

| | | | |
|---|---|---|---|
| Phosphate of Iron | 77.18 | | |
| Acid Phosphoric Dilute | 980. | (=98 absolute) | =solution. |
| Quiniæ Sulphate | 87.2 | | =solution. |
| Syrup | 1140. | | =precipitate. |




Or one molecule of the original, one molecule where quinia has replaced sodium 2 in the citrate, one molecule of quinia phosphate, (quinia saturating two units of the triatomic acid), and throwing off four hydrogens, and one molecule of sodium sulphate besides 7 $H_2O$ from the crystallized quinine.

Tinctures containing much alcohol will throw down some or all of the citro-sodic phosphate of iron, besides what appears in the statement just given. Glycerin is better than other diluents tried, as the precipitate is held in suspension and will shake up so that the whole may be given, while almost anything else causes a heavy deposit, which mostly clings to the bottle.

Many trials were made, using all known brands of iron phosphate to see if a variation occurred in products from different factories, but no difference was found. Acids as purchased in diluted form and samples made from concentration were tried.

The experiments were started upon a scale of one-quarter the prescription quantities and carried through on that system, and as it so happened that the first half fluidounce graduate used delivered at 70° Fah. 232 grains of acid, that ratio was accepted throughout for the calculations. A liquor made strictly by U. S. P. directions to represent a definite propor-

tion of iron phosphate did not react as did the scaled salts purchased. This is thought to be for the reason that the manufacturing houses do not complete the reaction, leaving out a portion of the sodium phosphate, as the scales are said to form better and be more soluble than if the citrate be wholly saturated. Therefore, all statements here made are based upon market articles such as would ordinarily be purchased by a careful pharmacist.

After the reading of this paper there was some discussion, in which Messrs. Patch, Kremers and Curtman participated, more particularly in regard to the confusion resulting from the use of the terms di-, bi-, and acid sulphate of quinine, and it was urged that the pharmacopœial salt should properly be designated as normal sulphate.

Mr. Fennel read the next paper:

## THE CHEMISTRY OF THE ELEMENTS ENTERING INTO SYRUP OF PHOSPHATES OF IRON, QUININE AND STRYCHNINE OF THE PHARMACOPŒIA.

BY CHARLES T. P. FENNEL.

"Nature will not deliver her oracles to the crowd, nor by sound of trumpet. We must open our minds to her in solitude, with the simplicity of children, and look earnestly in her face for a reply."

—WALTER SAVAGE LANDOR.

It was profoundly observed by Bacon, that "in all generation and transformation of bodies, we should inquire what is added, what remains and what is lost; what is united and what is separated." This is the true character of inductive philosophy; careful observation and rigid analysis. These sentiments are applicable in this instance, and must ultimately lead to the solution of this and analogous queries which are annually presented before this body. The writer doubts whether any other subject has received more attention than the one under consideration, and yet the writer will reject all hypotheses and the authority of distinguished names connected with the subject, and present a rational solution to these tantalizing queries.

To arrive at definite conclusions, it will be necessary to consider all factors that enter into the various processes and compounds which make up the final product. The pharmacopœial formulæ for the preparation of the solutions that virtually enter into the final product presuppose that the materials used are all of standard strength and purity, with the subsequent production of compounds of definite and uniform strength.

Practical experience has shown the fallacy of such an assumption, even under the most favorable conditions of care, judgment and skill. It naturally follows that the strict adherence to pharmacopœial processes will produce variable results and necessitate assays for strength to obtain positive and harmonious results. According to this method of reasoning, the first factor for consideration will be the solution of tersulphate of iron.

SOLUTION OF TERSULPHATE OF IRON.

There is no difficulty in preparing this solution to meet the requirements of the pharmacopœia so far as its identity and purity are concerned, but as to its strength this preparation will show considerable variance. The percentage of ferric oxide must be ascertained, and according to this percentage a corresponding equivalent used. There can be no question of doubt as to its composition, viz., an aqueous solution of normal ferric sulphate, $Fe_23SO_4$, the officinal strength being 28.7 per cent.

The second factor to be considered:

SOLUTION OF FERRIC CITRATE.

According to the pharmacopœia this solution contains *about* 35.5 per cent. of the anhydrous salt, symbolized $Fe_22C_6H_5O_7$, molecular weight, 489.8.

The process consists in the production of a fresh and well washed ferric hydrate ($Fe_26OH$), and its subsequent solution in crystallized citric acid ($H_3C_6H_5O_7\overset{H_2O}{—}$). Strict adherence to the pharmacopœial formula will produce reliable and fairly concordant results, but skill and judgment are essential. The allowance for loss for the want of this skill and judgment are very fair, and yet frequently, with the exercise of the greatest care, factors enter during the process of preparation that produce results far below the pharmacopœial strength. It is well established that the ferric trihydrate ($Fe_26OH$), brown in color, is completely soluble in citric and tartaric acid. It is further well known that a dehydration takes place in the process of washing, the *dehydration* being proportionate to the *time* of *contact* and *temperature*. The produced *basic* hydrates are virtually insoluble in citric and tartaric acid. The exact manner of dehydration is unknown, but from analogy we may symbolize the process as follows:

$Fe_26OH = F_2{'''}O_3{''}3H_2O$ = Trihydrate Iron—(Ferric Trihydrate).

$Fe_2O_33H_2O—H_2O = Fe_2{'''}(O''4(OH)')^{vi}$ = Binhydrate Iron—(Ferric Binhydrate).

$Fe_2O_33H_2O—2H_2O = Fe_2{'''}(O_2{''}2(OH)')^{vi}$ = Monohydrate Iron—(Ferric Monohydrate).

$2Fe_2O_33H_2O—3H_2O = Fe_4{'''}(O_3{''}6(OH)')^{xii}$ = Sesquihydrate Iron—(Ferric sesquihydrate).

This process of dehydration is perceptible to the eye by change of colors from brown to brownish red, to reddish brown, and finally to brick red. Chemically this process of change can likewise be shown and most beautifully illustrated in the preparation of the saccharated carbonate of iron by the reagents ferro- and ferricyanide of potassium. In this latter compound, the process is one of oxidation and hydration and virtually the reverse process. The proneness of ferric trihydrate to form lower hydrates or basic hydrates, induced the writer to suggest the modifications offered in the American Druggist, January, 1890, and supplemented in the Digest of

Criticisms on the Pharmacopœia. It is, therefore, apparent that the proper precipitation of ferric trihydrate is of the utmost importance, and must be accomplished in dilute solutions to insure rapid washing; the alkali must always be in excess to prevent the formation of basic salt at the very beginning; the solutions must be cold to prevent the formation of basic hydrates; in fact, all factors producing heat, especially strong sunlight, must be considered.

Some years ago, the writer was much surprised at the effect produced by sunlight on a solution of ferrous citrate, and subsequently on the scaled salt of both citrate of iron and the ammoniated citrate of iron. Solution of ferrous citrate kept in bottles partially filled, excluded from sunlight, suffered no decomposition, yet the same solution exposed to sunlight soon showed evidence of ferric condition, no matter whether the vials were completely or partially filled. Sunlight was the factor producing the change. Accidentally, the scale salt of ferric citrate produced by drying with strong sunlight was tested with ferricyanide of potassium and found to indicate a ferrous condition. The original solution from which the scale salt was produced failing to give this reaction, it was but natural to conclude that a reduction had taken place induced by sunlight or citric acid, either combined or singly. Experiments since then have convinced the writer that sunlight is a factor to be considered at all times; further, that sunlight tends to produce a reduction rather than oxidation, that the latter effect is produced most rapidly under the influence of a good current of air; further, that citric acid, in the presence of ammonia, produces a similar reduction in the dark, especially when exposed to atmospheric influences.

Another factor, not strictly entering into the question, is deserving of consideration at this point; viz. the peculiarity exhibited by organic acids, such as citric and tartaric acids, in presence of ammonia.

I. Water of ammonia added to salts of iron in combination with inorganic acids, decomposes them with the formation of ferric trihydrate ($Fe_2 6OH$) and salts of ammonia of the respective inorganic acids liberated, and in which the produced ferric trihydrate is virtually insoluble.

II. Salts of iron combined with organic acids such as citric and tartaric acids suffer the same decomposition, but the produced ferric trihydrate is soluble in the accompanied ammonia salt. Such a condition may exist in the process of the above preparation, and form more than a probable possibility for the production of the ammonio citrate of iron, even when skill and judgment are at the command of the operator.

The chemical process being symbolized as follows:

$$\text{I. } 3Fe_2 3SO_4 + 18NH_4OH = 3Fe_2 6OH + 9(NH_4)_2SO_4$$
$$3Fe_2Cl_6 + 18NH_4OH = 3Fe_2 6OH + 18NH_4Cl.$$

In both instances the ferric trihydrate produced is insoluble in the am-

monia salt accompanied with it, and the latter may be obtained virtually pure in quantities proportionate to their molecular weight.

II. The chemical process under the above Article II. is symbolized $3Fe_22C_6H_5O_7 + 18NH_4OH = 3Fe_26OH + 6(NH_4)_3C_6H_5O_7$, and as quickly as the ferric trihydrate is formed, solution takes place in the accompanying ammonia salt, proportionate to the quantity set free or produced; but since the quantity of citrate of ammonium formed is insufficient to form the normal double salt (citrate of iron and ammonium—$3(Fe_2(NH_4)_33C_6H_5O_7)$, it is but rational to suppose the formation of the next lower or basic salt, in which the ferric trihydrate suffers dehydration and conversion into the ferric binhydrate, $3Fe_2(O_4{}''(OH)')^{vi}$ (as previously shown), this latter salt combining with $(6(NH_4)_3C_6H_5O_7)$ citrate of ammonium to form $\{Fe_6{}'''(O_8{}''4(C_6H_5O_7)''')^{xviii}, 2(NH_4)_3C_6H_5O_7\}$ mono-ammonio binhydrate ferric citrate and $(12NH_4OH)$ ammonia free, in quantities proportionate to (⅔) two-thirds of the original quantity. Practical test demonstrates that the reduction is not partial but complete; that is, that the ferric trihydrate suffers dehydration to the formation of the ferric monohydrate $(3Fe_2{}'''(O_2{}''2(OH)')^{vi}$ and this combining with $(6(NH_4)_3C_6H_5O_7)$ citrate of ammonium to form $\{Fe_6{}'''(O_6{}''2(C_6H_5O_7)''')^{xviii}, 4(NH_4)_3C_6H_5O_7\}$ di-ammonio monohydrate ferric citrate; and setting $(6NH_4OH)$ ammonia free, proportionate to (⅓) one-third of the original quantity—the chemical *resumé* being symbolized as follows:

$$3Fe_2O4(OH)+6(NH_4)_3C_6H_5O_7=Fe_6O_84C_6H_5O_72(NH_4)_3C_6H_5O_7+12NH_4OH.$$
$$3Fe_2O_22(OH)+6(NH_4)_3C_6H_5O_7=Fe_6O_62C_6H_5O_74(NH_4)_3C_6H_5O_7+6NH_4OH.$$
$$Fe_6O_84C_6H_5O_72(NH_4)_3C_6H_5O_7=3\{Fe_2{}'''(NH_4)_2{}'(O''2(C_6H_5O_7)''')^{viii}\}.$$
$$Fe_6O_62C_6H_5O_74(NH_4)_3C_6H_5O_7=3\{Fe_2{}'''(NH_4)_4{}'(O_2{}''2(C_6H_5O_7)''')^{x}\}.$$

The chemical reaction between ferric citrate and water of ammonia is symbolized as follows:

$$3Fe_22C_6H_5O_7+12NH_4OH=3\{Fe_2(NH_4)_4(O_22C_6H_5O_7)\}+6H_2O.$$

That this compound $(Fe_2(NH_4)_4O_22C_6H_5O_7)$ di-ammonio-monohydrate ferric citrate is formed can readily be demonstrated.

Neutralizing 42 grains of crystallized citric acid with ammonia water of known strength, and noting the quantity, these 42 grains of crystallized citric acid should produce 54.38 grains of ferric citrate $(Fe_22C_6H_5O_73H_2O)$; therefore this quantity was taken and gradually dissolved in the cold by ammonia water of the same strength, the quantity necessary for solution being 24.3 grains; the water of ammonia assaying 27.89 per cent. ammonia gas by weight. The experiment was repeated in every conceivable manner, and the result invariably the same. The facts established may be summarized as follows: That the quantity of ammonia water necessary to produce transparent garnet red scales, known as ammonio-ferric citrate is (⅔) two-thirds as much as is necessary to neutralize an equivalent quan

tity of crystallized citric acid. Practical tests further show that a quantity of ammonia water in excess will indicate free ammonia, and a quantity less will produce opaque brownish red scales.

The molecular weight ascertained at the temp. 100° C., until constant weight was obtained, would indicate the absorption of two molecules of water, its composition being $Fe_2(NH_4)_4O_2 2C_6H_6O_7 2H_2O$; molecular weight 629.8, containing 25.3 per cent. ferric oxide.

The next factor for consideration: Citrate of iron.

Referring to the pharmacopœia, we obtain the following information, a scale salt $Fe_2 2C_6H_5O_7, 6H_2O$, M. wgt. 597.8; obtained by evaporation of any convenient quantity of an aqueous solution containing about 35.5 per cent. of the anhydrous salt to a syrupy condition at a temperature not exceeding 60° C. and spreading on plates of glass.

Admitting that all the necessary precautions had been taken in the preparation of the solution of citrate of iron, the query will nevertheless arise as to the constitution of the scale salt so far as water of crystallization, if such it may be called, is concerned.

To avoid all objectionable features of a possible contamination with ammonia or ammonia salts and basic salts of iron, the writer adopted the following method for the preparation of ferric citrate: Freshly precipitated barium carbonate was dissolved in citric acid, the resultant barium citrate thoroughly washed and dried at water-bath heat. A known quantity (7.89 grains), was dissolved in 100 c.c. of water, and to this solution were added 13.9 grains solution of tersulphate iron, assaying 28.7 per cent. The precipitate of barium sulphate was collected, thoroughly washed, the washings and filtrate collected and evaporated on a water-bath in the dark. Gradually minute scales were found floating on the surface of the liquid; these were collected and dried until the weight remained constant, which was found to be 5.5 grains. Much more difficulty was experienced in the process than was anticipated, for the barium citrate is virtually insoluble in water; the produced ferric citrate adhered with wonderful tenacity to the precipitated barium sulphate, and lastly, in the process of concentration a reduction to the ferrous condition took place. The reduction was avoided by evaporating in the dark. The process was much simplified in future experiments by adding to a solution of tersulphate of iron, dissolved citric acid, and adding to this mixture freshly precipitated barium carbonate, in molecular weight proportions. The produced barium sulphate removed by filtration is subsequently washed, the filtrate and washings concentrated at water-bath heat in shallow dishes excluded from light.

The product consisted of small, flat, shining tablets, brown in color, with golden yellow hue, containing three water of crystallization or absorption, according to the following composition $Fe_2 2C_6H_5O_7 3H_2O$.

The next factor requiring consideration would be the preparation of phosphate iron, emphasized

FERRIC PHOSPHATE.

The precipitates formed by treating soluble ferric salts with alkaline phosphates vary greatly in composition according to the nature of the solutions used and the proportions in which they are mixed.

The normal ferric orthophosphate $Fe_2 2PO_4$ is white in color, insoluble in water, nearly insoluble in acetic acid, slightly soluble in water containing carbonic acid gas, soluble in dilute mineral acids. It is precipitated from these by alkali, alkaline carbonates, acetates. These physical properties being well established, it follows that, to insure complete precipitation by alkaline phosphate, the solution of iron must be as neutral as possible.

The point of exact neutrality is not so readily ascertained, and, therefore, it has been found to be advantageous to add considerable quantity of an alkaline acetate, owing to the insolubility of the normal ferric orthophosphate in solutions of alkaline acetates. Aside from these properties, the orthophosphate of iron thus prepared is soluble in citric and tartaric acids and their salts of the alkali, the resultant compound forming scale salts soluble in water. Solubility being wanting in the normal salt and yet the desideratum, the peculiar property of solubility in alkaline citrates was utilized, and gave rise to the officinal salt known as ferric phosphate—the officinal process being embodied in the following formula:

Citrate of iron—5 parts.

Phosphate of sodium—6 parts.

Distilled water—10 parts.

Dissolving the citrate of iron in the distilled water by water-bath heat, and adding the phosphate of sodium under constant stirring until dissolved. Evaporating the solution at 60° C. to a syrupy consistence and spreading on plates of glass. The bright green transparent scale salt thus obtained is to be kept in well-stoppered bottles and protected from light.

The chemical process is symbolized by the following equation:

$$3Fe_2 2C_6H_5O_7 3H_2O + 6Na_2HPO_4 12H_2O = 3Fe_2 2PO_4 + 4Na_3C_6H_5O_7 + 2H_3C_6H_5O_7 + 81H_2O$$
$$3Fe_2 2PO_4 + 4Na_3C_6H_5O_7 + 2H_3C_6H_5O_7 = 3Fe_2 2PO_4, 6Na_2HC_6H_5O_7$$

Adhering strictly to the pharmacopœial formula a scale salt was always produced which differed in the color designated by the officinal process; the color of the resultant salt being on the order of red, deficient in brilliancy and transparency. The error in results was ascertained and found to be due to the lack of sodium phosphate.

Calculating the theoretical quantity, it was found that 6.58 parts of sodium phosphate ($Na_2HPO_4, 12H_2O$) were necessary for 5 parts of ferric citrate ($Fe_2 2C_6H_5O_7, 3H_2O$) Practical experience required 6.6 parts instead of 6.58 parts; this difference in proportions being in all probability due to the loss of water in the ferric citrate.

Adopting the following proportions and adhering to the pharmacopœial directions—

Ferric citrate ($Fe_22C_6H_5O_73H_2O$)—5 parts.
Sodium phosphate ($Na_2HPO_412H_2O$)—6.6 parts.
Distilled water ($H_2O$)—10 parts,

The desired bright green transparent scale salt was obtained. Operating with 543.8 grains ferric citrate, the resultant product under constant weight was 828.2 grains.

The composition therefore would be $3Fe_22PO_46Na_2HC_6H_5O_79H_2O$, or its equivalent $Fe_22PO_4,2Na_2HC_6H_5O_73H_2O$.

The salt containing (3) three water of crystallization or combination, the assay for metallic iron indicates 13.5 per cent.

A solution of this salt in water was subjected to the following conditions:

Sample No. I. Solution (1–8) completely filling 4 oz. bottle.

Sample No. II. Solution (1–8) partially filling 4 oz. bottle.

Both were set aside in the laboratory subject equally to the influence of light and temperature and examined for free phosphoric acid after two, four, and six months.

In every instance the quantity found represented (⅓) one-third the original quantity of acid present, with but very slight variation.

The same experiment repeated by exclusion of light showed the presence of free phosphoric acid, but in variable quantities, so that no definite conclusions have as yet been arrived at, but inference is at hand that the result will be identical only requiring a longer period of time.

We may therefore reach the natural conclusion that a reduction takes place with the formation of basic salt, this reduction being analogous to the dehydration of ferric trihydrate and symbolized as follows:

$$3\,Fe_2\,2\,PO_4 + 3\,H_2O = Fe_6O_3\,4\,PO_4 + 2\,H_3PO_4.$$

The addition of ammonium hydrate or sodium carbonate facilitated the precipitation, a condition frequently occurring in the preparation of the ingredients entering into the officinal syrup of phosphates of iron, quinine and strychnine, as set forth by the preceding data. We may therefore positively state that ferric phosphate U. S. P., slowly gives up part of its acid in aqueous solution, more especially if the aqueous solution be alkaline, and that consequently precipitation will take place at all events.

Lastly, the syrup into which the preceding preparations enter, and which bring with them the factors that apparently produce defects:

*Syrupus Ferri, Quininæ et Strychninæ Phosphatum.*

According to the pharmacopœia, we obtain the following information:

| | | |
|---|---|---|
| Phosphate of iron ($Fe_22PO_42Na_2HC_6H_5O_7$, $3H_2O$) 827.8 ...... | 133 | parts. |
| Quinine ($C_{20}H_{24}N_2O_23H_2O$) crystallized, 378.0 ............... | 133 | " |
| Strychnine ($C_{21}H_{22}N_2O_2$), 334 ............................. | 4 | " |
| Phosphoric acid ($H_3PO_4$) (containing 50 per cent.), 98 ...... | 800 | " |
| Sugar ....... ......................................... | 6000 | " |
| Distilled water................ sufficient quantity to make | 10,000 | " |

The ferric phosphate is dissolved in water, to the solution of which is added the phosphoric acid, this mixture being used as a solvent for the alkaloids, and lastly adding more water and sugar to make the required quantity.

Experience has shown that the syrup gradually darkens, and that precipitation takes place in the course of time. No preparation has given so much annoyance, for the reason that the results do not appear to be uniform in the hands of different operators, at one time satisfactory and at other times the very opposite.

The writer feels confident of having clearly demonstrated, by the preceding data, that with the exercise of the greatest skill and judgment the precipitation of the officinal ferric phosphate in a basic condition can not be avoided, and further, that the formation of this basic salt is the result of natural influences. The observations and results obtained further show that the precipitation may be accelerated by the careless preparation of any one of the compounds which enter into the final product, and that a lack of skill and judgment, and the necessary precautions essential to the production of trustworthy compounds, apparently indicate a defective formula; yet such is not the case, for the formula is as perfect as man can make it.

MR. KREMERS: For the last year and a half, I must confess, on looking up the subject appertaining to scale salts of iron, I have been unable to find a single formula substantiated by analytical results. It was a great surprise to me, and the more I worked on the subject the more I have come to the conclusion that all the scale salts of iron, thus far, do not deserve a chemical formula, because they are not chemical units in any direct sense of the word. Take, for instance, the simplest of all, citrate of iron. The pharmacopœial formula, with six or seven molecules of water, is wrong, because there is no water of crystallization in the compound. Citrate of iron is an amorphous, not a crystalline compound. If we were able to obtain any of these scale salts in a crystalline form, we could determine their chemical formulas; but as long as we have to do with amorphous substances, it is entirely impossible to have chemical formulas for them, and much less can we assign to them water of crystallization. If I were to define, for instance, the citrate of iron of the Pharmacopœia, or the solution, I would call them "citrates of iron with a quantity of moisture," or "citrate of iron containing so much per cent. of iron and an indefinite amount of moisture," or something of that kind; but you cannot assign to them any chemical formula.

MR. ECCLES: I overheard a professor say that analysis is the soul of chemistry. I beg to differ with the gentleman. I believe that rational speculation, that philosophy is the soul of all natural sciences, but that in chemistry analysis is the backbone. We may speculate—it is very well that we should, and I am the last one to under-estimate such work—but ordinary speculation ought not to find its way into standard books such as the Pharmacopœia, or text-books like those we have on pharmacy, unless these formulas are backed by chemical analysis.

MR. KREMERS: Very recently we have been trying to work out some of these formulas, and I think the very first was citrate of iron. We have been unable to assign to it any chemical formula, because there is no chemical unit. We have here a mixture of the

ferric citrates, and cannot attribute to them so and so much water of crystallization, because there is none. The water is present as moisture, and varies with the temperature and the conditions of the atmosphere at which the solution has been scaled. I have made these remarks in a general way; but I expect to report on this subject to the Wisconsin Pharmaceutical Association this year, and have not analytical data now with me.

MR. FENNEL: In regard to the term, "water of crystallization," I admit that it is not strictly correct, but in the paper it is coupled with the affix, "if such it may be called." It is water which "at 100° C. is chemically retained," and you cannot deprive it at that temperature. If you go higher you destroy the compound. This is chemical work, and is the result of an observation made incidentally about eight years ago. The Ohio State Pharmaceutical Association asked for a solution of ferrous citrate of definite strength. To me the question seemed ridiculously easy. I commenced to work on it, and ascertained by whatever method I tested, I received a ferrous salt more or less oxidized. I finally used the insoluble barium compound, and got a very nice green solution that assayed a definite strength of ferrous citrate. I kept the solution in a completely filled bottle, hermetically sealed. After a year, I came across that bottle, and found it was only partially filled. I noticed, at the same time, that it was cracked, and after unwrapping it, found on the bottom a white crystalline compound. I came to the conclusion that there had been a vacuum produced, a loss of water taken up by the compound itself, and that the external pressure of the air held the pieces of bottle in position without any loss, because the outside of the bottle showed no traces of solution coming out. I afterwards proceeded to ascertain the composition of that white compound, and found it to be ferrous citrate, containing 3 molecules of water of crystallization.

MR. L. F. STEVENS: I agree with Mr. Fennel as to his statement of the structure of ferric citrate, and that there is water held there, in whatever shape we may call it. I have not estimated the amount of water, but have accepted the statement of others.

The following paper was presented:

## CALCIUM HYPOPHOSPHITE.*

BY L. E. SAYRE, PH. G.

Hypophosphite of calcium is directly or indirectly the source of the officinal hypophosphites, as well as of the commercial hypophosphorous acid; hence its purity is an important consideration. The most common adulterations of this salt are the phosphite, phosphate, carbonate, and sulphate of calcium. These four admixtures may be separated from the hypophosphite by cold distilled water, in which they are insoluble. It may be also contaminated with zinc sulphate, zinc oxide, sodium chloride, and magnesium carbonate and sulphate, which can be recognized by their usual tests.

Under my direction Mr. A. J. Eicholtz, of the University, made an analysis of five samples of this salt, obtained in open market, which gave the following results:

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* Answer to Query No. 88: Calcium hypophosphite is largely contaminated with insoluble salts of calcium. Estimations of the amounts present are desired, and a means of avoiding the contamination.

| | $Ca(H_2PO_2)_2$ | $CaSO_4$ | $CaCO_3$. |
|---|---|---|---|
| 1 | 98.23 | 1.08 | .66 |
| 2 | 99.16 | .49 | .35 |
| 3 | 99.71 | .25 | trace |
| 4 | 96.92 | 2.25 | .78 |
| 5 | 99.31 | .19 | .50 |

The insoluble portion of these salts was found to consist almost entirely of the carbonate, which is largely due to the small quantity of calcium hydrate soluble in water not having been removed, and which, during evaporation, was changed by atmospheric carbon dioxide into calcium carbonate. This is an impurity which is easily removed. The U. S. P., in requiring a completely soluble salt, excludes this impurity. A little carbon dioxide passed through the filtrate, after separating the excess of lime and calcium phosphate, boiling and filtering again, is all that is required to completely remove it; there are two filtrations necessary in the ordinary method of preparation, so the only additional expense in avoiding this impurity will be the generation of carbon dioxide and filtering.

A few other samples tested qualitatively showed the presence of magnesium and soluble phosphate.

In the assay of this salt, the three methods proposed by Moerk * were employed, receiving the best results by the use of the potassium permanganate method, which is about as follows:

Dissolve 1 to 2 gm. calcium hypophosphite in 50 c.c. water and 10 c.c. dilute sulphuric acid. Add potassium permanganate until the liquid above the precipitated hydrated manganese dioxide has a distinct purple color; the mixture is heated to 60° C. for one-half hour; should the supernatant liquid become colorless, more potassium permanganate must be added. By addition of a measured quantity of normal oxalic acid, the excessive potassium permanganate is reduced and a colorless liquid results; to this is now added sufficient potassium permanganate to produce a permanent pink color. From the total potassium permanganate added is subtracted that quantity which is required by the oxalic acid, the remainder being the quantity necessary to oxidize the hypophosphites; 316 parts of potassium permanganate equaling 212.5 parts of calcium hypophosphite.

The mercuric chloride method is as follows: Dissolve 2 to 3 grams of the hypophosphite in 25 c.c. water and 1 c.c. of hydrochloric acid. Then add 75 c.c. of a saturated solution of mercuric chloride and heat on water bath from 45 to 60 minutes. Filter through a weighed filter, and heat the filtrate to the boiling point for several minutes; if no further precipitation takes place, the precipitate is well washed with boiling water, dried at 100° C., and weighed. If precipitation occurs again filter. The weight of mercurous chloride multiplied by .09038 gives the amount of calcium hypophosphite.

† See American Journal of Pharmacy, 1889, pp. 326 and 386.

The third method consists in the oxidation of an aqueous solution of bromine, and must be applied to neutral solutions to obtain accurate results. In the use of this method 0.2 to 0.3 gm. of the hypophosphite are mixed with 100 c.c. of water in a covered beaker, to which bromine is added, a few drops at a time, until the color no longer disappears even after the application of a moderate heat. The excess of bromine is removed by boiling the solution until free from color. To this is added 15 c.c. of a neutral 10 per cent. calcium chloride solution and a few drops of phenolphthalein. By titrating with normal sodium hydrate solution and multiplying the number of c.c. of solution used by .01416, the quantity of calcium hypophosphite will be obtained.

In the analysis of these different samples sulphuric acid was determined by the use of barium chloride, and the carbonate by adding a known excess of normal oxalic acid and titrating the excess with normal sodium hydrate, the deficiency of sodium hydrate being calculated as carbonate.

The test for soluble phosphate in the U. S. P. becomes unreliable, because most of the commercial hypophosphite contains sulphate. Moerk proposes the following requirements: "The addition of ammonia to an aqueous solution of the salt, in sufficient quantity to produce an alkaline reaction, should yield no precipitate." The soluble phosphate of calcium is an acid salt, and not likely to be found if an excess of lime was used in the preparation of the hypophosphite; granting its presence, however, the requirement of forming a neutral solution, which must not yield a precipitate on addition of ammonia hydrate to alkaline reaction is a more appropriate and trustworthy test for phosphate.

From the analysis of different samples it will be seen that the properties attributed to such salts cannot be those of the hypophosphite chemically pure. It being also a part of the answer to query to devise a method of preparation whereby this salt may be manufactured free from contaminations usually met with in the market, I have the following to suggest:

After a number of experiments the process given below was found to be highly satisfactory, although there may yet be much room for improvement. The value of this process is based on the decomposition of gases formed in the reaction between the hydrate of lime and phosphorus.

The process is as follows: Mix a sufficient quantity of hydrate of lime with three times its weight of water, to which a third of pure alcohol has been added. The mixture is introduced into a long-necked flask and heated gently on a sand bath. When the mixture has attained a temperature of 50° to 60° C., small pieces of phosphorus are gradually added, until the action has almost ceased. The apparatus is allowed to cool and the solution filtered through asbestos. Pass $CO_2$ into the filtrate, and again filter to separate the carbonate formed. The filtered liquid is freed from alcohol by distillation in a retort; the residual solution is evaporated to per-

fect dryness, and the white powder thus obtained preserved in well-stoppered bottles. The hypophosphite may be crystallized in the retort, by slow evaporation.

The action of the alcohol is thus explained: The phosphorus acting on the hydrate of lime by heat gives the hypophosphite of lime and phosphoretted hydrogen ($PH_3$.)

According to Gerard Janses,* two intermediate products are also formed—the "biphosphoretted hydrogen ($P_2H$) and the triphosphoretted bihydride ($P_3H_2$)." The alcohol decomposes these compounds, forming phosphide of ethyl. This is again decomposed by the base into hypophosphite and alcohol. The action terminates by a feeble evolution of hydrogen from the decomposition of the phosphoretted hydrogen.

This method has many advantages. It is practical, of easy manipulation, requiring little skill, and yields a preparation which is chemically pure. A salt manufactured by this process upon assay yielded 99.98 per cent. of calcium hypophosphite, which showed most of the contamination ordinarily met with absent. The contents of the retort, after the reaction has been completed, contain a large amount of alcohol, which, by simply raising the temperature of the water bath, will be distilled over. In this way the loss of alcohol during the operation is very small, and the expense thereby much reduced.

Mr. Stevens read the next paper:

## CERTAIN INSTANCES SHOWING THE EFFICACY OF GLYCERIN AS A MENSTRUUM TO REPLACE SYRUP IN WHOLE OR IN PART.

BY LUTHER F. STEVENS, BROOKLYN.

Reply to Query 48.

Sugar, soon after it became a factor in the economy of civilization, was found to possess keeping qualities so marked that it came into almost universal use for that purpose, and to-day "preserves" represent a long and indispensable line of household goods protected from change by its presence.

In our own business we find it valuable for the same purposes still, for syrups are but infusions saturated with sugar, but we also discover limitations, as there are in the application of any tool which we must employ for our work. Is it then wise to disdain these boundaries set by nature, or to accept, when necessary, something else which will better perform that function?

We remember a time when sugar was largely used to preserve fluid extracts. Research has shown a pathway of improvement for these, although still open to advancement.

It has been found that an addition of but a small proportion of glycerin to the menstruum for producing cinchona tinctures was a most service-

* Chemical Journal, vol. iv, page 312.

able change, as it largely aided in this case to hold in miscible solution the alkaloids of the bark in their natural combination with kinic and cincho-tannic acids; and probably few careful operators would now desire to go back to the older plans, though we may perhaps be willing to try one still further forward.

I am aware that with some there remains a prejudice against this valuable agent, which, in its advent, marked an epoch in the world's industrial progress, and has since become celebrated as a powerful solvent, sometimes ready to enter into a chemical combination, and is well known to be of itself a true food, not assimilated as fast nor so readily as sugar, yet capable of sustaining life in the human system for a considerable space of time, and particularly when the digestive tract is badly out of order; some such cases I have seen and know them too, and, *per contra*, have never met nor heard of an authenticated instance where harm has occurred from its internal administration.

A few formulæ are offered which are well known disturbers of the druggist's peace of mind, upon which trials have been made by myself and friends, extending sufficiently long to have discovered any possible disadvantages had such appeared, but facts seem to point entirely the other way.

The present method of preparing ipecac syrup is much complained of in public print. The fluid extract as now made, though the process is tedious, enables the emetine to be held, which was not formerly the case; but when that is added to syrup, even under most favorable circumstances, and keeping this mixture upon ice, it soon disintegrates, becoming ropy; later filled with flakes of extractive and decomposed matters, and losing the greater portion of its therapeutic value, to say nothing of unsightliness, which the pharmacist does not enjoy—and all this description is not including this syrup exposed to fermentative processes by careless making and handling.

How many gentlemen of our occupation follow the Pharmacopœia in making rhubarb syrup? We probably all had ample experience with one or two trials; certainly I dropped in very short order that procedure drawn from the dark ages of pharmacy, because the resulting syrup, if made in any quantity, will not keep, neither does it represent the amount of drug commenced with; hence, perforce, the profession has fallen back upon the formula of 1870, despite disadvantages connected therewith.

Aromatic rhubarb syrup, by officinal methods which are very convenient, yields a muddy and inelegant product, and ordinarily such conditions mean less medicinal power, which latter difficulty happens here.

Elegance in pharmacy has been decried and sniffed at; most of us were brought up to suppose that the worse-looking and the more horrible-tasting was a medicine, so much better would be its effect, but of late years we find that the exact opposite of these ancient theories is most likely to be true.

These three are typical samples of menstruum and material ill suited to each other, and the results are neither handsome nor efficient for that very same reason; they also give examples where a wonderful change can be made to occur in each deficiency by a partial substitution of a more active solvent.

Now concerning details for a moment. If in ipecac one-quarter of the total product be glycerin, the fluid extract first diffused through that, and then syrup added sufficient to finish the quantity wanted, the result is a reliable compound with which I have been successful for more than a decade, standing time and summer heat as well as any syrup can be expected to, and retaining its medicinal value; and I have yet to see a better method, or one so simple.

The ammonia process of extraction from the root seems to offer possibilities of a material more soluble in syrups alone, but considerable experimentation must yet be gone through to prove the situation. The present claim is that more emetine is obtained by that method, and that in fluid extract and tincture it is held much better than heretofore.

For rhubarb, the merchantable fluid extracts can be utilized, and produce a better article of syrup than do the directions either of 1870 or 1880. The first step is to alkalize the fluid extract, which is much more readily done than in a corresponding effort upon a quantity of coarsely ground root; then mix the solution with an equal weight of glycerin, and finally dilute with syrup to the proper quantity.

The better the primary stock the greater alkalization will be necessary, as the active principles seem to hold in intimate combination with oxalate of lime, which only yields to a more powerful chemical.

A formula theoretically agreeing in strength with the officinal, is as follows:

| | | |
|---|---|---|
| Potassium carbonate.......... | 96 to 120 grains | 8 to 10 grams. |
| Water....................... | fl. ℥ij | 10 " |
| Fluid ext. rhubarb............ | avdp. oz. 2 | 80 " |
| Glycerin..................... | avdp. oz. 2 | 80 " |
| Tinct. cinnamon ............. | fl. ℥iij | 12 " |
| Syrup sufficient to finish....... | Oj (≑ avdp. oz. 25) | 1000 " |

Mix in the above order, using a capacious mortar or other container, seeing to it that the fluid extract is well "cut" before going further, whether it takes more or less of the alkali as above given.

Following this plan, you will find your syrup more active than by any method yet published, and a pharmaceutical product of which you need not feel ashamed either in appearance or work.

Aromatic rhubarb syrup is distinctly bettered by using an equal volume of glycerin to the strong tincture before adding the syrup.

Senega and squill compound are better protected by glycerin than by syrup; even one-quarter replacement is a great improvement; either will

then stand quite well in shelf bottles even during summer months, despite their well-known capacity for going off.

Wild cherry, if made in a cool place in closed vessels and the infusion percolated through sugar until saturated, instead of being shaken, and thus getting filled with air-bubbles, which change some of the essential portions, will hold its own for long periods if the stock is kept in a cool place. At one time I had frequently to make it in five and ten-gallon lots, doing the macerating in the same percolator from which the infusion was to be extracted, but sealed over with heavy paper, and when ready dropping from that directly into another beneath containing the sugar, from whence the syrup collected in the stock demijohn at the bottom of all, and everything perfectly air-tight. This may seem too operose for general use; it may be avoided by giving what in this case, too, is a better protector, *one-half glycerin*—the present 5 per cent. is a nuisance only, and of no practical use.

A syrup not officinal but in demand throughout the country, stillingia compound, is a fit subject for a total change, and it so happens that a wholesale house in New York began sending it out in that combination a long time ago, and apparently with success. I once asked one of the managing gentlemen why they did not label it glycerite or glycerole and let it run on its style, but he only said, "Hush!"

Liquor ferrous iodide is much less subject to oxidation, the cause of it spoiling when in a bath of glycerin, than in syrup, but it is not as easily made, though the old procedure might be revived of filtering the hot liquor through a long-necked funnel into a bottle of glycerin held in hot water.

The ancient and honorable brown mixture becomes an elegant and effective medicament, which it is not now, when powdered extract of licorice, or the so-called pure extract, give way to the fluid extract, and acacia, sugar and water replaced by glycerin and syrup; then the other materials have a chance to get in their best work.

These suggestions offered are not intended to carry the idea that wide and radical changes are needed in syrups, that glycerin should replace everything and everywhere, but that we should not throw aside a useful solvent, which, as stated, has proved by careful experiment to be a betterment in many stubborn cases, because of some non-founded prejudice, nor because our grandfathers did not use it.

Sugar, too, is a different material from olden days. To make solutions of it by boiling, is now the poorest of methods, while cold percolation is the best, and agitation intermediate. Once boiling was necessary for the sake of clarifying, or in other words to free from impurities; whatever outside matters are now present in white sugar are *soluble in boiling water, but not in cold*, which is a sufficient reason for carrying out cold processes whenever possible, even without considering the much greater ease and convenience.

MR. STEDEM: I would ask Mr. Stevens whether in making his experiment he used the officinal fluid extract of ipecac.

MR. STEVENS: I am speaking, throughout, of officinal extracts.

MR. STEDEM: I always have made the syrup according to the official formula given in the Pharmacopœia, and have never had any trouble. It makes a very clear, nice syrup, and I don't see how any improvement can be made. It keeps all right if made from the official fluid extract.

MR. EBERT: In regard to the addition of glycerin to syrups, I think there is an objection to it on account of its sweetness, by many to whom it has been administered. Glycerin, on that account, is a very poor addition to syrups. The same object the writer had in view of removing those principles that produce an unsightly appearance, could be obtained by the use of a certain amount of glucose, which acts as a solvent for such matters.

MR. MARTIN: Although I do not want to say that I consider all the syrups of the Pharmacopœia failures, yet I have found a number of them to be susceptible to fermentation after having them on my shelf for two or three months. At the same time, I do not altogether lay it to the Pharmacopœia, because it might have been due to faulty manipulation, and this, it seems to me, might have happened with Mr. Stevens. It might also have been the case that the materials were not of the best. Mr. Stevens made the statement in relation to the formula for syrup of rhubarb of the U. S. P., that after one or two trials he threw it overboard. I claim that that is not a sufficient trial for a new remedy. In order to prove whether the formula is perfect or not, you must make at least a dozen trials, because your manipulation may be faulty and your goods not the same one time as at another.

MR. STEVENS: I know perfectly well that Mr. Ebert has a strong prejudice against glycerin. I remember a gentleman who, when glycerin first came out, had a similar prejudice. A lady came into his store one day, and said that some one had told her that glycerin was a nice thing for a cough. He said that he "would not recommend glycerin at all for internal use, for it was very poisonous." To prove that it was poisonous, he said that it came from lead, and to show that it came from lead he turned to the process then in the dispensatory where lead was directed in the making of lead plasters, and the glycerin washed out, purified, etc.; and so he concluded that the glycerin came from the lead, instead of the fat. Now, I don't suppose that Mr. Ebert looks at it in that light, but he says certain things I do not agree with. For instance, he says that it does not agree with some persons. I recommend it to people whose digestions are out of order, and have seen people kept alive with glycerin where nothing else would stay in any part of the alimentary canal, not only for short periods, but for several weeks at a time, thus showing its possibilities as a food under such circumstances.

MR. HALLBERG: What becomes of the glycerin after it has remained in that part of the body?

MR. STEVENS: It is taken up, digested, and split up, as is the case with other articles of diet.

MR. HALLBERG: Digested, and split into what?

MR. STEVENS: It is hard to tell what things become after being digested.

MR. HALLBERG: I don't know that it goes any further; I believe that glycerin taken into the stomach remains glycerin.

MR. STEVENS: I think otherwise, because, from the facts I am familiar with, it doesn't come out as glycerin at all, but in the ordinary manner of digested food.*

MR. HALLBERG: Within a few months, a letter was read at an Association meeting from a pharmacist in West Virginia, which had been written to a pharmaceutical friend, protesting against the use of glycerin internally, but not on the same ground that Mr. Ebert does. His point was, that as glycerin was used in suppositories as a cathartic, it was therefore evidently a cathartic when taken into the stomach in any shape whatever.

MR. ELIEL: At the meetings of the Indiana State Association, whenever ipecac is mentioned, I am presumed to get on my feet, and I would like to make some remarks on this subject.

Mr. Stedem says that he has had good success with the officinal process, using the Pharmacopœial extract. I have tried the same process. It makes a beautiful syrup, but after it has stood on your shelf three or four weeks, in warm weather, it is not quite so beautiful. It is very desirable indeed that some change should be made in this formula. I fully believe that the formula here proposed is a partial solution of the question, for the simple reason that glycerin is a better solvent for the active principle of ipecac than water. I believe emetine is soluble in only about 1000 parts of water, and it perhaps requires even a greater amount than that. I am sure emetine is precipitated out of syrup of ipecac of the U. S. P., after standing for some time. The officinal preparation is not held in perfect solution, and undergoes fermentation in warm weather.

MR. STEDEM: The Pharmacopœia directs that syrup of ipecac be made in small quantities. It is, however, rapidly made by following the directions, and you can make four or eight ounces at a time. In the winter time we make a larger quantity. There is no necessity for making a large quantity. I cannot help thinking that the fluid extracts used where there is a failure are not made according to the official formula. I have had fluid extracts of ipecac labeled "U. S. P.," which did not make the same syrup that a fluid extract prepared in my laboratory made. For that reason, I do not believe that where failure results the syrup of ipecac was the U. S. P. or made by its process, though it may have been of correct ipecac strength.

MR. STEVENS: I bear Mr. Eliel out in his statement regarding the final precipitation of the emetine, owing, perhaps, to decomposition that occurs. What he says is correct, whether the fluid extract is made of strictly Pharmacopœial standard or not. That change goes on more rapidly in hot weather. In my statement here, in regard to the use of glycerin, I do not mean that there shall be a sweeping alteration in all processes. It may be possible to find some better method, but I do not recommend anything without having given extensive and careful attention to it. The samples I took have been proved by my friends through periods of over ten years.

The following papers were read in abstracts:

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*Catillon, in 1877, found that taken in small doses, glycerin is oxidized in the organism to carbonic dioxide and water; when taken in larger doses it is found in the urine, but not in the fæces; during its use the weight of the body increases. On the other hand, Munk (1878) and Lewin (1879) found glycerin to be not in the least degree nutritions.—EDITOR.

## SYRUP OF LACTOPHOSPHATE OF CALCIUM AND SOLUBLE LACTOPHOSPHATE OF CALCIUM.*

BY HUGO W. AUFMWASSER, PH.G.

### *Comments.*

It is a well-established fact that the syrup lactophosphate of calcium precipitates a white amorphous compound upon standing—the series of investigations made were with the view of ascertaining the composition and means of preventing its formation.

Freshly precipitated tricalcium phosphate with lactic acid reacts as follows:

$$Ca_3 2PO_4 + 4HC_3H_5O_3 = CaH_4 2PO_4 + 2Ca2C_3H_5O_3.$$

The tetrahydrogen calcium phosphate is an unstable compound, and the lactate of calcium is not strong enough to hold it in solution; the result is the precipitation of monohydrogen-calcium orthophosphate symbolized as follows:

$$CaH_4 2PO_4, 2Ca2C_3H_5O_3 = 2CaHPO_4 + Ca2C_3H_5O_3 + 2HC_3H_5O_3.$$

#### ANALYSIS OF THE PRECIPITATE.

*Part I.*—Estimation of calcium as calcium carbonate.

Ppt. 1.1590 gm. dissolved in water by the aid of HCl, ammonium oxalate added in excess and AmHO to alkalinity—set aside for 24 hours. The precipitate filtered, washed, dried and transferred to platinum crucible; the filter incinerated with ammonium carbonate (to convert oxide into carbonate) and added to the contents of crucible and heated to faint redness for fifteen minutes. After cooling and weighing, the heating was repeated with the addition of more ammonium carbonate, cooled and weighed, and repeating until weight remained constant.

Weight 0.8375 = 72.26 per cent. calcium carbonate—operation in duplicate gave 72.61 per cent. $CaCO_3$.

#### PHOSPHORIC ACID—ESTIMATION.

Dissolved 0.41 of the precipitate in water acidulated with nitric acid, and added ammonium oxalate and hydrate to remove calcium. Filtered, washed completely and added washings to filtrate, concentrated the filtrate and precipitate with magnesia mixture, filtered, washed precipitate and incinerated until the precipitate ceased to lose weight. Weight as $Mg_2P_2O_7$ 0.3215 equivalent to 51.54 per cent. $P_2O_5$.

### *Resumé.*

1st estimation, $CaCO_3$, 72.61 per cent.
2d estimation, $CaCO_3$, 72.26 per cent.

---

* Chemical Laboratory Cincinnati College of Pharmacy—Supervision Wm. Simonson, Ph.G.

Average, 72.44 per cent. equivalent to 40.56 per cent. CaO.

$$\left.\begin{array}{l} CaO = 40.56 \text{ per cent.} : 56 = 0.723 \\ P_2O_5 = 51.54 \text{ per cent.} : 142 = 0.363 \\ H_2O = 7.90 \text{ per cent.} : 18 = 0.44 \end{array}\right\} .363 \left\{\begin{array}{l} 2CaO \\ 1P_2O_5 \\ 1H_2O \end{array}\right\} = \begin{array}{c} Ca_2H_2P_2O_8 \\ \text{or} \\ CaHPO_4 \end{array}$$

Monohydrogen-calcium orthophosphate.

The addition of phosphoric acid to the officinal preparation will prevent the formation of the monohydrogen salt. The following formula will yield a satisfactory preparation:

| | |
|---|---|
| Tricalcium phosphate $Ca_32PO_4$ | 23.0 gm. |
| Phosphoric acid 50 per cent. $H_3PO_4$ | 31.7 " |
| Lactic acid $HC_3H_5O_3$ | 33.0 " |
| $NH_4OH$, HCl flavoring. | |

Sugar and water according to the U. S. P. to make 1000 grammes.

*Part II.*—Estimation of calcium and phosphoric acid in commercial soluble lactophosphate of calcium.

The preparation in question is a white amorphous powder, readily soluble in water having a distinct acid reaction.

Estimation of calcium as before—

1st. 2.0445 substance yielded 0.5380 $CaCO_3$ = 26.314 per cent., or 14.7 per cent. CaO.
2d. 3.040 substance yielded 0.7922 $CaCO_3$ = 26.05 per cent. or 14.59 per cent. CaO.

Estimation of phosphoric acid—

Fused gr. 1.011 of the substance with 5.00 $Na_2CO_3$ for 2 hours, dissolved the resulting mass in water acidulated with HCl and transferred to beaker neutralized with $NH_4OH$, and added ammonium oxalate to remove calcium. The filtrate and washings rendered alkaline, and with the usual magnesia mixture determined phosphoric acid, as $Mg_2P_2O_7$; weight, 0.037, corresponding to 3.66 per cent., $Ca_32PO_4$ = 2.4 per. cent. $P_2O_5$.

2d estimation—

Oxidation with nitric acid, precipitating phosphoric acid with molybdic acid solution, as ammonio-phospho-molybdate, washing the precipitate with dilute molybdic acid solution, then dissolving in the smallest quantity of stronger water of ammonia, neutralizing with HCl, and proceeding as before with magnesia mixture.

3d estimation—

Oxidation with $KClO_3$ and $HNO_3$, and subsequently treating the liquid as in the second estimation.

The results fairly corresponded with first estimation.

The estimation of lactic acid was unsatisfactory, and therefore not recorded. The difficulty ascribable to the fact that lactic acid does not form any distinct insoluble salts.

Estimation of free acid by volumetric analysis with NaOH.

Estimation as barium lactate, owing to its solubility in alcohol, failed to give satisfaction.

Owing to the limited time, the subsequent analysis will be deferred to a future time.

## ON SYRUP OF CALCIUM LACTOPHOSPHATE.

BY H. W. AUFMWASSER.

Although the literature of this subject is an extensive one, and although a number of modifications of the official formula have been proposed, the difficulty still remains that the preparation is an unstable one, precipitates of a variety of forms appearing sooner or later, containing calcium always and either lactic or phosphoric acid.

The purpose of this work is to determine the precise character of these precipitates, and with a knowledge of their composition to adopt means for preventing their formation.

These precipitates are in two characteristic forms—masses or clusters of minute crystals of cauliflower form, and granular crystalline powder.

At times the syrup, remaining transparent, solidifies, presumably due to precipitation of *tri*-calcium-phosphate. Such a specimen not being obtainable since this inquiry was begun, nothing can be said about the composition of the precipitate.

When the syrup is prepared by the useful alternative formula, (Rother's) employing two molecules of phosphoric acid and three of calcium carbonate, the second precipitate will usually form, if not at once, almost invariably upon the addition and solution of sugar.

In a specimen of such a precipitate, calcium was estimated as oxalate, weighing as carbonate, phosphoric acid as ammonium-phosphomolybdate, weighing as magnesium pyrophosphate, and water by difference.

Gm. 1.159 ppt. gave .8375 $CaCO_3$ = 40.56 per cent. CaO.
Gm. .410 ppt. gave .3215 $Mg_2P_2O_7$ = 51.54 per cent. $P_2O_5$.
By difference .................... 7.90 per cent. $H_2O$.

These percentage figures indicate 2 molecules calcium oxide and one molecule each phosphoric acid and water. 2 $CaO,P_2O_5,H_2O$ or $CaHPO_4$, mono-hydrogen-calcium phosphate.

The first form was found in a specimen of the syrup made according to the official method, and had deposited slowly during two or more years.

It was soluble in water, slowly in the cold, very easily and abundantly in heat, gave reactions for calcium and for lactic acid, was neutral in reaction and therefore was calcium lactate. Its appearance is due to the fact that out of the material ordered by that formula can be formed more calcium lactate than the quantity of water can hold in solution, the proportion being one part of calcium lactate in seven parts of water, while the limit of permanent solubility is one part of the salt in nine and one-half parts of water.

The formation of this precipitate can not be prevented apparently, but it may be redissolved again by warming the syrup, the solution being permanent for a long time.

The formation of the second precipitate is due to the decomposition of a small part of the tetra-hydrogen-calcium-phosphate into mono-hydrogen-calcium-phosphate and free phosphoric acid, the presence of the latter producing a state of stable equilibrium. The more dilute the solution, the greater must be the relative proportion of free acid to keep up this stable condition. The remedy is therefore the addition of phosphoric acid to the prepared solution before dissolving therein the sugar. This solution is preferably made by using calcium carbonate and phosphoric acid instead of calcium phosphate. It must contain the calcium as tetra-hydrogen-calcium-phosphate, the decomposition of which is then prevented by added phosphoric acid.

In practice, if the free acid is one-fourth of that used in obtaining the tetra-hydrogen salt, the soluble calcium salt $CaH_4 2PO_4$ will not suffer decomposition. It will not do to have a solution of tri-calcium-, or of tetra-hydrogen-calcium-phosphate in presence of lactic acid alone, as in each case mono-hydrogen-calcium-phosphate will form. The presence of free phosphoric acid is necessary.

The following formula has been found to yield a permanent syrup:

| | | |
|---|---|---|
| Calcium carbonate | 21.3 | parts. |
| Phosphoric acid, 50 per cent. | 109.4 | " |
| Lactic acid | 33 | " |
| Orange-flower water | 80 | " |
| Sugar | 600 | " |

Distilled water, a sufficient quantity to make 1000 parts.

Dissolve the carbonate of calcium in the acids diluted with the orange-flower water, and with 150 parts of water, filter the solution and wash filter with water to obtain 400 parts. In this dissolve the sugar, if necessary with little heat.

Inasmuch as the "commercial soluble lactophosphate of calcium" has been proposed as a starting-point for this syrup, a good readily-soluble specimen was examined.

Estimation in duplicate gave:

| | | |
|---|---|---|
| CaO | 14.7 | per cent. |
| $P_2O_5$ | 2.4 | " " |
| Lactic acid | 77.28 | " " |
| Water by difference | 5.62 | " " |
| | 100.00 | " " |

Calculating the $P_2O_5$ to tri-calcium phosphate and remainder of calcium to calcium lactate, it contains one molecule $Ca_3 2PO_4$ to 28 molecules calcium lactate. As the proportion of the official formula furnishes 7 mole-

cules $Ca_32PO_4$ to 28 of lactic acid, the use of the commercial soluble salt is not permissible.

*Covington, Ky.*

## REACTION BETWEEN POWDERED BORAX, GLYCERIN AND SODIUM BICARBONATE.

BY J. U. LLOYD.

Some months ago a druggist handed me a prescription containing ingredients about as follows: Powdered borax, ½ ounce; bicarbonate of sodium, ½ ounce; carbolic acid, 10 drops; water and glycerin, of each, 2 ounces, asking me what would be the probable result of the compounding of the prescription. It did not occur to me that any unusual reaction would take place, and I was surprised on being informed that the mixture had been compounded and had exploded in the bottle. Upon experimenting with the ingredients I found that the water and carbolic acid were passive, and that the prescription could be filled without the glycerin without visible reaction. The addition of glycerin, however, produced violent effervescence by reason of the liberation of carbonic acid gas, and it was found that a mixture of bicarbonate of sodium and powdered borax reacted upon each other in the presence of glycerin, producing sodium borate and carbon dioxide, a fact that had previously escaped my observation. The matter was mentioned to Prof. Norton, then President of the Cincinnati Chemical Society, and he agreed to look up the literature on the subject (if any existed), the fact that such a reaction would result from these substances having also escaped his attention. In compliance he mailed me the following abstract from the "Boston Journal of Chemistry," December, 1877, from which it seems that the combination had been studied previously. The phenomenon may be of interest to others in pharmacy, for I have reason to believe that the reaction has been overlooked by most of those who fill prescriptions.

"Mr. M. W. Ibes, of the Hopkins University, gives the following as his explanation of the effervescence on mixing glycerin, borax, and sodium bicarbonate.

"Since glycerin is one of the best solvents known, and also since glycerin dissolves more carbonate of soda than of any other salt, therefore when these salts come into solution together there will be a displacement of one molecule of carbonic acid by one molecule of boracic acid, and the resulting product will be two molecules of normal or neutral borate of soda, because when boracic acid is in solution it is a stronger acid than carbonic acid (see Gmelin's 'Handbook of Chemistry'). Furthermore, the readiness with which the chemical action takes place is partly due to the fact that boracic acid neutralizes the alkalies imperfectly, a fact clearly substantiated by borates having an alkaline reaction."—*Boston Journal of Chemistry*, December, 1877.

## NOTE ON ACID SUBLIMATE DRESSING.

BY ADOLPH LEVY.

E. Laplace *(Deutsche Medicinishe Wochenschrift)* published a formula for making a solution of mercuric bichloride which possesses the properties of preventing the changes that are going on in the presence of organic matter—particularly the decomposition of albuminous matter not prevented by the addition of ammonium chloride, to which chloride of sodium is generally added in aqueous solutions of mercuric chloride. As these themselves were far from possessing the stability required for the purpose of preparing dressings, the author substituted for them with most gratifying results tartaric acid* as follows:

Mercuric chloride 1 part, tartaric acid 5 parts, in distilled water 1000 parts.† Compressed tablets have been prepared containing in each mercuric bichloride 3.5, tartaric acid 17.5.

Two of these tablets dissolved in 1 pint of water will make a solution of the strength of 1 to 1000.

The tablets may be colored with a harmless pigment to guard against their careless use. They are instantly soluble in warm water. Gauze, thoroughly sterilized, after being washed and ironed, and immersed in the solution of the strength 1 to 1000, retained its activity in moist condition for over one year (the solution containing 1 per cent. of glycerin). The tartaric acid acts as a mordant to fasten the medicinal agents thoroughly to the fibre of the material.

When used for continuous application as an irrigating fluid to extensive mucous surfaces in very weak form, it acts promptly as a stimulant (in from 1-2000 to 1-4000), and has been extensively employed by active practitioners, who report very favorably, considering it an improvement on the old style form of solution.

*Brooklyn, N. Y.*

## THE PRACTICAL USE OF THE MICROSCOPE IN PHARMACY.

BY ALFRED R. L. DOHME, PH. D.

Nearly every graduate in pharmacy who has taken his degree during the course of the last twenty years has become acquainted with the theories underlying the use of the microscope, and also the results that may be achieved by its use in the hands of a microscopist. I venture to assert, however, that but few of this large number have ever done much practical work with this subtle and valuable instrument, and still fewer have ever made any practical use of the same in their profession.

* Tartaric acid is in use for at least six years for this purpose by Max Kohnemann, Berlin.--C. S. N. H.

† This is the formula of Laplace, Deutsche Medic. Wochenschrift, Oct. 6, 1887, republished in the Proceedings Amer. Phar. Assoc., 1888, p. 462.—EDITOR.

Medical men have used it more generally for some time past, and since the recent interesting observations and discoveries of our celebrated bacteriologists and histologists all over the scientific world, its use is becoming more general every day, so that the time is not distant when every graduate in medicine will be compelled to be skilled in its use and to use it for diagnostical as well as research work. Pharmacy is keeping pace with her sister sciences of bacteriology, histology and chemistry, and in this particular branch she must not fall behind, for her advances in the decades to come will be along the lines of microscopical work, combined, to be sure, with chemical work. Particularly in these days of close competition in all lines of trade, consequent upon which is the adulteration of products, natural as well as manufactured, is it incumbent upon every pharmacist to be able to detect the false from the true and the adulterant from the adulterated. I feel confident that the pharmacist will not shrink from the use of the microscope as an invaluable aid in enabling him to discover whether he is being imposed upon or not, when it is made clear to his mind that the processes involved in this work are very simple, inexpensive and easily as well as rapidly carried out. If he can be brought to see and appreciate this fact, the time will come when it will be as common to see a microscope in his laboratory as it is to see there his test-tubes, flasks and percolators.

It is not my purpose to enter into details about the mechanism or theory of the microscope, and I will assume that every one is conversant with these. I will hence at once proceed to enumerate what I consider to be the requisites for a microscopical outfit such as will suffice for the examination of any plant, drug or chemical that may come up for examination in the routine of a pharmacist's career. In the first place, a microscope such as will magnify from thirty to five hundred diameters is essential. Then object glasses, one by three inches in size, made of ordinary window glass, cover slips for the same of very thin glass, as can be bought at a very moderate price from almost any optician or dealer in microscopical supplies. A box of twenty-five of these will last for years. Also a razor, which is not an unknown quantity to most men, a few needles inserted in wooden handles to facilitate their manipulation, and a few good-sized corks of good quality. In addition to this are wanted a wash-bottle with distilled water, a watch-glass and a few drop-bottles containing glycerin, alcohol and several dye stuffs in solution to be used as staining agents. For the uninitiated, or initiated too for that matter, it is advisable, if not necessary, to have a book of plates or drawings of sections of all the various drugs as they appear when viewed through the microscope. Unfortunately there are very few of these extant, due largely to the fact that this branch of pharmacy has so long lain dormant. As we advance, however, and the demand increases, books will soon make their appearance "en masse," and among them, I have no doubt, will be found many ex-

cellent series of drawings of sections of all drugs, which will enable the pharmacist-microscopist to at once recognize the drug he is examining in section under his microscope.

While working with Professor Flückiger at Strassburg I made the acquaintance of an excellent little collection of drawings of sections of drugs as they appear to the eye when seen through the microscope. It is in French unfortunately, but that does not affect the value of the drawings, which remain the same for all tongues, and is published at Paris by the "Librairie F. Savy, 77 Boulevard Saint Germain," and has as collaborators and editors Professors J. Godfrin and Ch. Noël of the College of Pharmacy of Nancy. It is entitled: "Atlas Manuel de L'Histologie des Drogues Simples," which translated into English reads, "Manual of the Histology of the Simpler Drugs." Mr. Gerock, Prof. Flückiger's assistant and a most excellent microscopist, first called my attention to the book, and Professor Flückiger himself also heartily endorsed it. The cost of the book is a very modest one, being only six francs ($1.25). This constitutes the complete outfit of our pharmacist-microscopist, and it is plain that, outside of the microscope, there is little necessary that a pharmacist has not already in his laboratory.

In regard to the staining agents I shall speak more in detail when I come to the subject of staining the prepared section. Now let us begin our preparation of the section of a given dry drug that comes up for examination, taking, for simplicity's sake, a root or stem to begin with. We place our microscope on the table before us, facing the source of light—usually a window—and get the mirror at the proper angle to give us the best illumination. Our watch-glass is placed to the right of the instrument, and some water poured into it from the wash-bottle. A small piece of the drug, preferably a small thin root not more than an inch in length, is then immersed in the water and allowed to remain there until it has become quite soft and well saturated with liquid. While this is soaking we take a good sound cork, and with our razor cut it in two through the centre along its longer diameter, being careful to have both cut surfaces smooth. We next take our saturated root and place it between the two pieces of cork, so that it rests between the two flat surfaces of the latter. The upper surface of one of these is lowered below the level of the other, and the top of the root must protrude above the top of the lower piece of cork and below that of the higher piece. It is well to cut off a piece of the root with the razor prior to cutting sections therefrom, so as to have a fresh surface to cut from when we are ready to begin operations. Having this freshly-cut surface of the root just barely protruding above the surface of the lower piece of cork, all being held together between the thumb and first finger of the left hand, we take the razor in the right hand, and with a shearing motion draw the razor across the surface of the root. In this way cut about six or eight very thin sections of the root, all of which will adhere to

the razor. Next remove these into the water in the watch-glass, and see if any of them are thin enough for use. (They must be decidedly translucent, if not transparent, in order to be fit for use.) If none of them are thin enough, cut some more until one thin enough is obtained. We next place before us one of the already described object glasses, and from our wash-bottle drop a drop or two of water upon its surface. With one of the mounted needles we now place our best section or sections upon the drop of water, and then place over this one of our cover-glasses or cover-slips, as they are generally termed. By slightly pressing upon the surface of the cover-slip with our needle, we now attempt to remove as many as possible, if not all, of the air-bubbles that have collected under the same. This can usually be done, especially by the aid of a small piece of bibulous paper, which too serves to remove the excess of water protruding beyond the edge of the cover-slip. A few drops of alcohol dropped upon one of the edges of the latter and drawn through the liquid under the cover-slip by means of a piece of bibulous paper placed on the opposite side very frequently removes the most stubborn air-bubbles.

Our slide is now ready for examination under the microscope. As the water is very apt to evaporate before the examination is completed, it is well to drop a drop of the same on the edge between the glass and cover-slip during the course of the examination. Having adjusted the objective of the lowest power, say 40 diameters, in place, we set our microscope so that it faces the source of light, and then adjust the mirror by looking through the ocular at the field until we are convinced that the entire field is most completely illuminated. We now place our slide upon the object-stand and slide the tube up and down until we can see the section fairly accurately. The final focussing is then done by means of the micrometer screw attached to the side of the tube. With an objective that magnifies about 40 diameters we usually can see all of the section, provided the latter is not broader than one-quarter of an inch, which it should not be to be of practical value. After having taken a general view of the section, we turn to our book of plates and see if any of the latter are similar to or very nearly so to the same. In some cases it is necessary to insert an objective of a higher power and examine certain parts more in detail, and then compare these again with our plate. It may also be necessary in some cases where there are many varieties of the same species, as, for instance, the cinchona barks, to make a longitudinal section in order to decide upon the exact variety, as many of the latter are almost if not exactly the same in cross-section.

As a rule we will not have to resort to staining by staining agents in order to decide what drug we have in hand, but it is sometimes necessary, and always pretty and interesting, to add a few drops of one of our staining agents to fully decide upon certain features of the drug section; for instance, which is cellulose and which is woody fibre, or which is starch

and which inulin or crystals of inorganic salts. This is, however, only a refinement, and not necessary for a decision of what we are examining. The staining agents most generally used and most decided in their action are the following:

*Aniline sulphate.*

| | |
|---|---|
| Distilled water | 10 c.c. |
| Sulphuric acid | one drop. |
| Aniline sulphate | 0.1 gram. |

*Phloroglucine.*

Five per cent. solution of phloroglucine in absolute alcohol made acid by concentrated hydrochloric acid.

*Eosine.*

| | |
|---|---|
| Eosine | 0.5 gram. |
| Absolute alcohol | 50 c.c. |
| Glycerin | 50 c.c. |

*Iodine solution.*

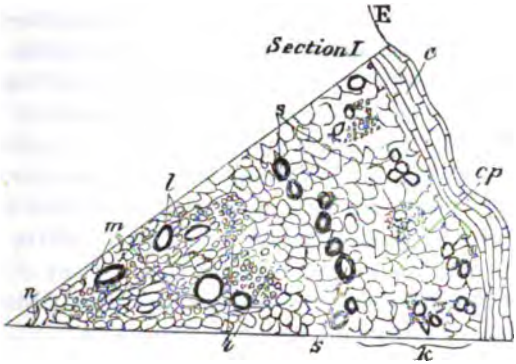
| | |
|---|---|
| Iodine | 1 gram. |
| Potassium iodide | 3 grams. |
| Distilled water | 60 c.c. |

Aniline sulphate is used to distinguish woody fibre from cellulose, as are phloroglucine and eosine, while iodine is used to detect starch. These solutions are to be kept in glass-stoppered drop bottles, and one drop dropped therefrom upon the edge between the object glass and cover-slip when used. Aniline sulphate colors the woody-fibre cells brownish-yellow, and leaves the cellulose cells uncolored. Phloroglucine, the preferable one of the three, colors the woody-fibre cells a lovely pink and leaves the cellulose uncolored. Iodine of course, as we all know, colors starch a deep purple-violet and does not color inulin or inorganic salts. There are many other staining agents, but the above will answer all purposes and are usually preferred for botanical microscopy.

At first it will, of course, be necessary to watch and study the plates very closely, making them answer the purpose of an instructor, but soon we will learn by experience and actual observation the characteristics of most standard drugs, and then be able to decide without referring to our plates. By following the method outlined in this paper there is hardly any doubt that almost every one can recognize drugs microscopically, and with a minimum expenditure of time and money. Besides the advantage gained in determining the drug, there is a fascination in microscopic work that will, I venture to assert, take hold of every one who has any desire at all to enter into it, and repay him amply in the shape of enjoyment, satisfaction and pride. In order to facilitate the understanding of those who are unfamiliar with microscopic work, a brief description of the various parts of the plants seen under the microscope may not be out of place. It must be borne in mind that as a rule we have to deal with roots and stems, but that sometimes we are also called upon to examine leaves, pollen and fruit of plants, as for instance: buchu, kamala and anise respectively.

For leaves and fruits, as for roots and stems, we usually take only cross-sections for examination, while for pollen and exudates we usually take the substance as it is met with in commerce. In making a cross-section of a leaf it is well to make the same as near as possible to the midrib, which is also

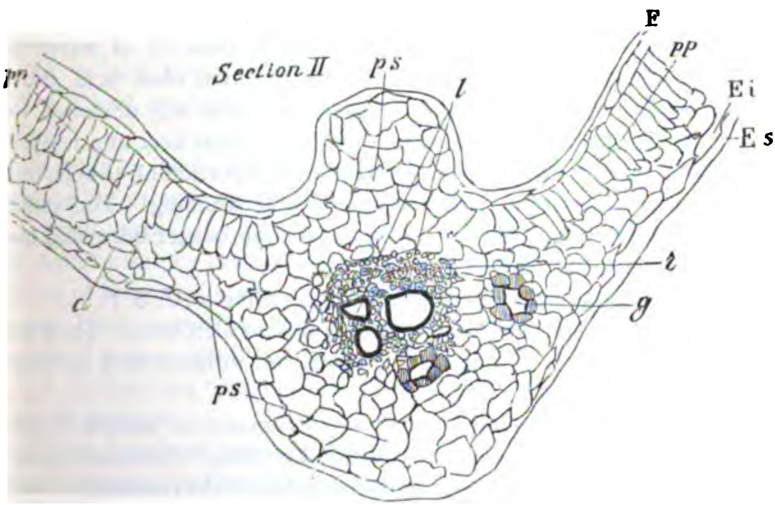
FIG. 1.




*E*—epidermis.
*c*—cork cells.
*cp*—cortical parenchyma.
*s*—sclerotic cells or bast tissue.
*r*—woody sieve ducts.
*t*—tracheotic tubes or dotted ducts.
*m*—medullary rays.
*n*—medullary parenchyma or pith.
*k*—secondary bark.

**Cross Section of Root of Pareira Brava.**

FIG. 2.




*E*—epidermis.
*Ei*— " inferior.
*Es*— " superior.
*a*—breathing cell.
*r*—woody sieve ducts.
*ps*—spongy parenchyma.
*pp*—palisade "
*t*—tracheotic tubes or dotted ducts.
*g*—secreting cells.

**Cross Section of Leaf of Erythroxylon Coca.**

to be included in the section. Let us take as an example of a root pareira brava and of a leaf a coca leaf—(see illustrations). These drawings I think point out nearly all of the varieties of cells and organs to be found in the plant. The difference in the various drugs will be found to consist largely, if not entirely, of the different arrangement of these various cells and organs. What the use and value of these various cells and organs are to the plant I will not discuss here, as that falls in the domain of botany rather than of microscopy. If I have by means of the above paper succeeded in inducing some of the many pharmacists before me, or scattered throughout the broad confines of our great country, to make their first attempt at microscopical work, I shall feel amply repaid for my efforts, for it will only require the first effort to make a microscopist out of any of you or them; if not a microscopist, certainly a microscopical enthusiast, which will before long cause you to become a full-fledged microscopist.

*Baltimore, June 18, 1892.*

## OLEATE OF MERCURY.

BY A. B. STEVENS, PH. C.

Queries Nos. 44 and 45.

Two of the samples of oleic acid used in the following experiments were obtained in the market; the first was of a dark reddish-brown color, disagreeable odor, and acrid taste; the second was of a dark straw color, and of a more pleasant odor and taste than the preceding; the third sample was manufactured from white castile soap, as follows:

One hundred grams of soap were dissolved in 1000 c.c. of water, and tartaric acid added in slight excess. The liberated oleic acid floated upon the surface in a cream-colored mass; the water was decanted and the mass washed twice. The mixture of fatty acids was kept at a temperature of 0° C. for twelve hours, when the greater portion of the palmitic and stearic acids separated and were removed by straining. This yielded an acid of a very light straw color and much pleasanter odor and taste than any found in the market.

Oleates of mercury were next prepared according to U. S. P.

No. 1 was made from best commercial sample of oleic acid. The resulting oleate was a liquid of a dark straw color, and within a week contained a large deposit of metallic mercury.

No. 2 was made from the darker colored commercial sample of oleic acid. It was a light-brown colored liquid of a syrupy consistency, gradually becoming darker on standing, and in a few weeks contained a heavy deposit of mercury.

No. 3 was made from the oleic acid from soap, contains 10 per cent. of yellow oxide of mercury, and prepared according to the German Pharmacopœia about as follows: Triturate the oxide of mercury with an equal weight of alcohol in a tared capsule. Add the oleic acid and triturate

until the mixture begins to thicken. Allow to stand 24 hours, warm the capsule and contents at a temperature not exceeding 60° C. to a constant weight. The product is of a light straw color, depositing mercury in a few weeks.

No. 4 is a 20 per cent. oleate, made from commercial oleic acid, following the method of the German Pharmacopœia. It is of a dark color, about the consistency of petrolatum, and at the end of three months is in good condition.

No. 5 is a normal oleate of mercury, containing 28.4 per cent. of yellow oxide of mercury prepared from oleic acid obtained from soap made after the method of the German Pharmacopœia. It is firm and of a light opaque color.

No. 6, like No. 5, except that red oxide of mercury was used instead of the yellow oxide. It is a firm mass of a very light color and almost transparent.

No. 7 was made like No. 5, except that no attempt was made to remove the stearic and palmitic acids from the oleic acid obtained from soap. It does not differ from No. 5, except that it is somewhat lighter.

No. 8 was made by double decomposition between potassium oleate and mercuric nitrate, according to G. M. Beringer's method. (Proceedings A. P. A., 1890, vol. xxxviii., p. 636.) The potassium oleate was formed by saponifying oleic acid with caustic potash, and the mercuric nitrate formed by dissolving red oxide of mercury in nitric acid. The oleate was of a light opaque color, and on warming sufficient to remove from the jar, became gray.

No. 9 was made by double decomposition between sodium oleate (N. F.) and mercuric nitrate. The resulting oleate is of a light opaque color.

In reply to Query No. 44, the writer would say that a true oleate should replace the present oleate of the U. S. P.

I would answer the first part of Query No. 45 by saying that the method of manufacture by precipitation should not be preferred to that of direct action of oleic acid upon oxide of mercury, for the following reasons:

1st. Direct action produces a more permanent preparation.

2d. It is more easily prepared.

3d. It does not contain water, which must be the case when prepared by precipitation.

The red oxide of mercury should be used in place of the yellow oxide, as it combines more readily, producing an elegant preparation.

The German method of treating with alcohol is a decided improvement over the U. S. P. method.

For a number of these experiments the writer is indebted to Mr. E. A. Grochan, class '92, School of Pharmacy, University of Michigan.

MR. ELIEL: Regarding the process by double decomposition, I desire to say that there

is no difficulty in removing the water from the oleate mass, if this be washed once or twice with a small amount of alcohol. There is no difficulty in driving off the alcohol, and you have an oleate absolutely free from water. This process has been in vogue in our store for some time. I have no trouble in making one absolutely free from water by washing in alcohol afterwards.

MR. STEVENS: What is gained by it? You don't gain any time.

MR. ELIEL: No; but there is less difficulty in making it.

MR. STEVENS: How long do you allow those made in this way and from the normal oleate to stand, to see which would keep longest?

MR. ELIEL: I don't know as to that.

MR. STEVENS: They should be compared under like conditions.

On motion, the Section adjourned until 8 o'clock.

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THIRD SESSION—SATURDAY EVENING, JULY 16.

The section was called to order by Chairman Hallberg at 8 o'clock p. m. The minutes of the preceding session were read by Acting Secretary Fennel, and on motion approved.

The reading of papers was then resumed, the following being read in abstract by Mr. Stevens:

## THE ACTION OF HOT SULPHURIC ACID ON BEESWAX, PARAFFIN, AND CERESIN, WITH A VIEW TO DETECTING THE LATTER AS ADULTERANTS OF BEESWAX.

BY C. C. SHERRARD, PH. C.

In the way of preface, I desire to say that although the main part of the results of the following work were presented to the Detroit Chemical Society, yet with some few additional notes to those presented before that Society, it was deemed appropriate to again quote these results in answer to the query above given. It is well known that few articles of commerce as extensively used, are more susceptible to easy and successful sophistications than beeswax. This is especially true when ceresin is made the adulterant. Other adulterants which have been named from time to time, as water, kaolin, starch, flour, resins, fatty bodies, gypsum, etc., are not considered in this paper, from the fact that they are rarely or seldom employed for the purpose named, and are comparatively easy of detection. Various methods for the detection of paraffin and ceresin have been suggested and applied, most prominent of which is the one based on carbonization of the wax by hot sulphuric acid, given by Allen in his Commercial Organic Analysis, vol. 2, page 188, and on which the U. S. P. 1880 test is based. Results obtained by repeated applications of the sulphuric acid test, as detailed by Allen, on commercial beeswax, both bleached and unbleached, invariably showed more or less adulteration, hence the query arose

as to its reliability in two particulars; the first being the possibility of failure to decompose all the beeswax at the temperature and in the time specified; secondly, whether or not some of the paraffin or ceresin could not be destroyed under the same conditions or under conditions which insured the complete destruction of the beeswax.

With a view of determining which if either of these two suppositions was correct, various experiments were performed in order to measure the influence of time and temperature on the carbonization. The sulphuric acid test as carried out by Allen is to heat 5 grammes of the sample to 130° C., in a capacious flask with 50 c.c. of concentrated sulphuric acid. Charring takes place, and sulphur dioxide and other gases are evolved, causing the fluid to froth considerably. After about ten minutes the mixture becomes almost solid, when it is allowed to cool, the acid removed by washing with water, and the residue treated with a little cold alcohol to remove adhering water. The filter with the contained black residue is then exhausted with hot ether, preferably in Soxhlet's tube, when the ether yields the hydrocarbon wax on evaporation. It should be weighed and then again treated with sulphuric acid and the residue exhausted with ether as before, as a little beeswax is liable to escape decomposition during the first operation. In applying this test it is necessary, in order to obtain as nearly a uniform temperature as possible, to stir the solution almost constantly after it has attained the temperature of 130° C.; in this way the temperature is kept almost uniform throughout, or as nearly so as possible. Without the stirring, the different strata in the container would be subjected to different degrees of temperature; so that if the temperature were adjusted to 130° C. for the lower stratum, the upper would be considerably less, and so for any other adjustment there would be a lack of uniformity of temperature; hence the necessity for careful stirring during the heating process. The U. S. P. test for paraffin as an adulterant consists in heating 5 grammes of the wax in a flask for 15 minutes with 25 grammes of sulphuric acid to 160° C., and the mixture diluted with water, no solid wax-like body should separate.

In the application of Allen's test the following modifications were made: The time of heating was extended to 15 minutes, observing the precautions previously mentioned, and second, the undecomposed wax or impurities were dissolved in a given amount of chloroform and an aliquot part taken for evaporation. The chloroform was adopted in preference to the ether, as it was found by several experiments to have in the cold a better solvent power over the ceresin than was the case with ether. Applying this test to a sample of yellow wax *known to be pure*, there was found to be after the first operation 22.8 per cent. of the wax undecomposed. Repeating the operation on this residue, there still remained undecomposed 12.1 per cent. A good grade of paraffin was then subjected to the same operation, with the result that after the first treatment there remained

undecomposed 81.6 per cent., and after the second treatment 64.8 per cent. remained undecomposed. From this it will be seen that even at the temperature specified, the wax is not wholly decomposed even on a repetition of the process, and further that this process applied to paraffin decomposes that body to a very appreciable extent. Consequently a pure wax will be reported adulterated, while an adulterated wax will show probably a lower percentage of adulteration than that actually present, notwithstanding the compensation which occurs by reason of the wax not being entirely decomposed. As a result of these preliminary experiments, I was led to make a further trial on pure wax at higher temperatures and for a longer period of digestion, with a view of fixing the lowest temperature and time that could be employed to fully decompose the wax, and having determined that point, to then obtain some idea of the extent of carbonization of ceresin and paraffin when treated similarly.

*Treatment of the wax.*—A sample of beeswax *known to be pure* was treated successively at 130°, 145° and 160° C. for 30 minutes and yielded respectively of undecomposed wax 12.7 per cent., 6 per cent. and 0 per cent. A second sample, also fully believed to be pure, was treated exactly the same, and yielded of uncarbonized wax 12.6 per cent., 6.1 per cent. and 0 per cent. From this it follows that 160° C. is necessary to decompose all of the wax in 30 minutes.

*Treatment of paraffin and ceresin.*—A sample of paraffin treated at 130° C. for 15 minutes, yielded 81.6 per cent. of residue, showing a carbonization equal to 18.4 per cent., and when the operation was repeated there remained 64.8 per cent. of residue showing a carbonization of 35.2 per cent. When the same sample of paraffin was treated at 160° C., for 30 minutes the residue was only 30 per cent., thus showing that it had suffered carbonization to the surprising amount of 70 per cent. It will be remembered that this is the temperature but not the time of the Pharmacopœial test. Ceresin treated at 160° C., for 30 minutes yielded 59.3 per cent. of residue, and was therefore carbonized to the extent of 40.7 per cent.

*Influence of temperature without the presence of sulphuric acid.*—The question now arose as to how much of the above loss was due to carbonization, and how much to volatilization at the high temperature employed. To settle this point, paraffin and ceresin were heated on an air-bath for 60 minutes at 160° C.; the paraffin lost 9.7 per cent., while the ceresin lost but 4.5 per cent., showing that volatilization, though comparatively slight, is not wholly to be ignored.

*Conclusions.*—It is concluded from these experiments that carbonization with hot sulphuric acid is not a satisfactory quantitative method, and that qualitatively it is only satisfactory when the adulterant is present in large proportion, and only then when the temperature is at least 160° C. Although as before stated these experiments were not performed expressly

in answer to this query, yet as they bear directly on it, I have offered them to you in hopes that they may be of interest.

The following paper was presented :

## THE CULTIVATION OF COFFEE IN JAMAICA.

BY C. G. LLOYD.

The island of Jamaica exports each year between eight and nine hundred thousand pounds of coffee, valued last year at a million three hundred and sixty thousand dollars, and the product was last year 15.7 per cent. of the total exports from the island. In former years the great bulk of this coffee went to England : thus only ten years ago, England got 73 per cent., while the United States only received 13 per cent. ; but beginning with 1884 the States have taken a large proportion of the product, and last year received 45 per cent., the year before 57 per cent. I am very sorry to have to report, however, that the United States only gets the poorer grades, the English paying a better price for the choice grades. The best coffee of the island is raised on the Blue Mountains, in the parishes of St. Andrew and St. Thomas, the eastern end of the island, which coffee almost entirely goes to England. I am informed by the planters of Manchester parish, who sort their coffee, that their best grades, also, go to England.

Jamaica (and also Hayti) coffee is of an average good quality, a little stronger than Java or Mocha, but not so strong and rank as the Rio. A large New York importer of West Indies products told me that a certain coffee firm, whose name is a synonym for wealth, had made a fortune in the last half dozen years, selling roasted Jamaica and Hayti coffee as "choice Java." I presume every one who knows nothing of the subject, has an idea how coffee grows, even if it is erroneous. We naturally imagine that it grows on trees like cherries, and I had expected to see a coffee plantation look like a cherry orchard.* When I left Kingston by rail for the interior of the island, a couple of weeks before Christmas, having been told that the coffee berries were then ripe, I kept a sharp outlook for the coffee trees, but saw nothing that I could take for them. On arriving at the station, I walked along the single road or street of the little village of negro huts, and chancing to stop by the side of a copse of tangled bushes which I took for a wild growth, I noticed a few coffee berries on the ground under the bushes, and on investigating found that these bushes were coffee shrubs. I tried to think of what they reminded me at home, and nothing conveys to my mind a closer comparison than a tangled undergrowth of Wahoo shrubs.

* My impressions had been formed from the picture plate 10, of the recent French work "Plantes Medicinales" of Dujardin-Beaumetz and Egasse. This plate is so grossly inaccurate, not only in regard to the character and apparent size of the coffee-tree, but also to the size, shape, color, and cluster of the berries, that it is a discredit to that otherwise very excellent work. A good illustration of a coffee branch is plate 106 of the German work just completed, Köhler's Medicinal-Pflanzen Atlas.

The bulk of the coffee of Jamaica is raised by small growers—negroes, who own from a half to five acres of ground, and who plant the shrub around the place without any order or system whatever, and apparently give the shrub no attention, excepting to break off occasionally the tops when they get too high or to cut off a few dead branches. In the statistics of the island, where the estates are specified which raise fifty acres or more of coffee, only thirty estates are named, comprising about 3,000 acres, while the acreage of small holders, less than fifty acres, is nearly 18,000. These small growers, of course, for the most part have no machinery for preparing or sorting the coffee. Almost every negro hut in the coffee districts has in the yard what they call a "barbicue." It is a flat drying surface, built where the sun will strike it, and reminds one of a square tray on a large scale, built of brick with raised edges and cemented smooth. The usual size is from twelve to twenty feet square. The negroes gather the coffee berries when they get ripe, a few each week, somewhat like we would pick gooseberries, one at a time. They put the berries into a wooden mortar and beat them, which separates the outer skins, which are washed away in buckets of water. The seeds are then put on the "barbicue" to dry. Without a close examination at this stage the product resembles large grains of coffee mixed with the imperfectly separated outer skins, but on closer observation we notice that each grain of coffee is enclosed in a thick, tough, cartilaginous skin. When the coffee has been dried on the "barbicue" this skin becomes brittle, and the negroes again beat it in the mortar to hull it out of this skin. Then the seeds are picked over by hand, the better part of them being sold to the little stores throughout the country, which we notice with the sign out, "Licensed to deal in agricultural products," and which pay Her Majesty's government two pounds each per year for the privilege. These small storekeepers send it to Kingston, from whence it is shipped abroad. Coffee merchants in Kingston, and some of the merchants in the smaller towns, sort the coffee into grades according to size and weight of the berry. Most of the sorting is done by hand, though some have sizing machines, as described further on.

On coffee plantations the same process is gone through, but on a larger scale, more systematic, and with the aid of machinery. The coffee shrub thrives best on new land, hence the portion of the plantation devoted to coffee growth is virgin soil cleared of its forest for this purpose.

Around Mandeville, in Manchester parish, the land is now almost all pasturage, and I am told that the whole of it was originally cleared off for the growth of coffee many years ago in slave times, and having raised its crops of coffee and exhausted the ground for this purpose, it was sown in Guinea grass and used for grazing. To establish a coffee plantation the land is cleared of its trees, burnt over, and cleaned up. Then it is laid out by pegs into squares of six feet, and young coffee sprouts about a foot high

are planted near each peg. These sprouts are generally obtained from beneath old shrubs, and are adventitious growths from seed dropped from the shrub, though sometimes nurseries are established for raising the young sprouts from planted seed. In these tropical regions, weeds and vines and wild growths of all kinds spring up very quickly, and with these the planter is constantly at war. Four times a year, at least, the fields should be gone over with a hoe and the weeds cut down. In three or four years the young coffee plants begin to bear, and the shrubs continue giving crops for about thirty years. The shrub, if left to grow, would reach a height of twelve to fifteen feet, but on a plantation they are topped when about four feet high, and kept to about this height by breaking off the tops and such suckers as appear. The branches are slender, and when the shrubs are not crowded, spread nearly horizontal. The leaves are evergreen (as, indeed are most of the shrubs and trees in the tropics), of a firm texture, smooth and shiny above. They are opposite, oval, entire, and borne on short petioles about one-half an inch long. They are three to five inches long, two to three inches wide, and are terminated by acuminate points.

The flowers are white, borne in clusters of three to six in the axils of the leaves, and are exceedingly fragrant. The petals are five, slender, spreading. The shrubs begin to blossom in February and continue in flower up to May; the fullest bloom is in March and April. Coffee does not blossom as our fruit trees, all at once, and go out of bloom in a week or two, but continues to bloom for about four months, and the crop in consequence ripens through the same length of time, and the planters are thus enabled to gather and care for it to better advantage than if it all ripened at once. The coffee season lasts from September to December, September and October being the principal months. The coffee berries are borne on short stalks in clusters of three to six in the axils of the leaves. When ripe they are about the size of cherries, but are oval (not globular), and slightly compressed on the side. Each berry consists of two seeds (familiar to us as the green coffee of commerce), each seed enclosed in a thick, tough white skin called the parchment skin, placed in the berry with their flat surfaces together, and surrounded with a small quantity of sweetened pulp, the whole enclosed in a thick skin like a Malaga grape. The color of the skin when ripe is red, not a bright red like a cherry, but a pale dull red.

The berries are picked by negro and coolie women, who go over the coffee shrubs, picking the ripe berries into baskets, and are paid by measure. The price varies according to abundance of the berries, but is regulated so that a woman makes about ninepence (18 cents) a day. Rats are very fond of the sweetish pulp that surrounds the coffee grains, and they climb the shrubs and gnaw off a great many berries. Birds are also said to pick them, and lizards—which are very numerous in Jamaica—are charged also with despoiling the fruit. This "rat" coffee is picked from

the ground by the women, and comprises about one-fourth of the crop. It furnishes a larger proportion of heavy grains than the berries gathered from the shrubs, as the rats are credited with selecting the largest and best berries, and it is kept separate in all the subsequent operations. As the bulk of this coffee is supposed to be gnawed off by the rats, all coffee picked up from the ground is called "rat coffee." It costs about double to gather it as when picked from the shrubs.

The women bring the berries to the works, where they are measured and paid for by the "Busher," as the overseer of a coffee plantation is called. To prepare the coffee for market the berries are first run through a machine called the "pulper," which tears off the outer skins and pulp. A "pulper" is simply a large cylindrical wheel about three feet in diameter and two feet long, covered with corrugated iron. like a nutmeg grater, and arranged so that it revolves so close to another corrugated iron surface that the berries cannot go through entire, but are caught by the rough surfaces and torn to pieces, the skins and pulp being carried through, the seed dropping beneath into a tank of water. The water serves to wash the grains, and also to separate the light from the heavy coffee: the former floating, are skimmed off; the latter sinking, are taken from the tank after the water is drawn away. Heavy coffee is much the better grade, and it is kept separate from the light in all subsequent operations. At this stage the coffee seeds are still enclosed in the "parchment skins," which are tough and cannot be separated from the seeds when green; hence the next process is to thoroughly dry the seed in order to make the "parchment skins" brittle so they can be hulled off. For this purpose the seeds are spread on "barbicues" similar to those previously described, only, of course, on a larger scale. The "barbicues" of an ordinary sized plantation cover about an acre of ground, and are usually built on sloping ground and terraced. When it threatens a shower, and every evening to protect it from the rain and dews, (which are heavy in the tropics,) the coffee is raked into a pile in the center of each barbicue and covered with a wooden cover-shaped hopper. From ten days to two weeks' exposure to the sun on the "barbicue" will dry the seeds so that they can be hulled. The "huller" is a large wooden wheel arranged to revolve like the wheel we see in brickyards, but running in a circular narrow trough. The coffee is placed in this trough, and the wheel constantly running over it breaks off the brittle "parchment skins," being heavy enough for this purpose, but not so heavy as to crush the seeds. The coffee seeds are separated from the broken "parchment skins," called trash at this stage, by being run through a "fanner," similar to the fans of our threshing machines, which blows off the trash. There still remain closely adhering to many grains of coffee thin light gray skins called "silver skins," which would hardly be noticed by the ordinary observer. To remove these skins and brighten the grains of coffee it is further dried in the warehouse for two or three

weeks, and again put through the "huller" and "fanner." The next step is to separate the "pea-berry coffee." A small percentage of the coffee berries, instead of containing the normal two seeds, have by abortion only a single seed. The grains of these single-seeded berries, instead of having a flat face, are rounded, and are called "pea berries." These "pea berries" are heavy and of the best quality, and bring a better price than the best grade of flat-faced grains. To separate them the coffee is run into a cloth belt slowly revolving at a slight inclined plane, the flat-faced grains being carried over the top, the rounded "pea berries" rolling off the bottom.

The coffee is next graded according to the size of the grains by being run through a "sizer." This is a cylindrical screen, consisting of four sections of different sized meshes, the smallest holes near the top. The screen revolves at an incline, and the different sized grains drop through the various sections according to size into bins beneath, the largest grained and best grade being carried through the cylinder.

Finally the coffee is given to women who spread it on a table and pick out all the deformed or broken grains, which are called the "tringe." The best grades of coffee are put in tierces holding about 800 pounds, and mostly shipped to England—the poorer grades and "tringe" into barrels or bags for this country.

I have given a description of the machinery which I saw in operation on the plantations. There are improved machines, I am told, but they are said to furnish no better results than the old ones.

In concluding this article, I wish to acknowledge my indebtedness for information and other courtesies to John H. Nosworthy, the "Busher" of Somerset Plantation.

The following paper was read by the author:

## ABSTRACTS FROM ANALYTICAL RECORDS.

BY F. A. THOMPSON.

Recognizing that data covering the examination of crude drugs, U. S. P. salts, chemicals, etc., are of much value and quite necessary in the researches of materia medica and pharmacy, and of deep interest to every progressive pharmacist, I have undertaken in this paper to present to this Association such facts as have been collected* and recorded in the analytical laboratory of Parke, Davis & Co.

My intention is to place before you, in as concise a form as possible, making a special point of avoiding details of processes, the results of assay of various articles as purchased and presented for examination before

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*Associates in performing this work have been Messrs. J. B. Nagelvoort, J. Stieglitz, C. F. Beckwith and W. J. Smythe.

consuming in the manufacturing laboratory. In the case of crude drugs it represents the assays of large lots, ranging from 100 to 1,000 pounds or more, comminuted for extraction, thus giving authentic data for their alkaloidal valuation. U. S. P. salts and chemicals are such as are purchased in original containers direct from the manufacturers in this and foreign countries.

The figures given embrace the work performed since 1891, unless otherwise stated, compared in most cases with the record of five or more years previous. The paper is not quite as complete as I might wish it, time for preparation being limited; but if it proves of interest to you as it is, I trust I may offer a more complete one at some future time.

CRUDE DRUGS.

General Processes Nos. 1 and 2 are those given in detail in Lyon's "Manual of Pharmaceutical Assaying," pages 21 and 22, and briefly are as follows: No. 1. The drug is exhausted with Prollius' mixture (ether 325 c.c., alcohol 25 c.c., and concentrated ammonia water 10 c.c.) and an aliquot portion of the ethereal solution evaporated at a low temperature, the residue re-dissolved in dilute acid water and ether; the acid solution washed with ether, the ethereal solution rejected, and the alkaloids extracted, after the addition of an alkali by means of an ether (3-vol.) and chloroform (1-vol.) mixture, and the solution evaporated to dryness and the residue dried to a constant weight. If the alkaloids are not completely soluble in acid water and quite free from color, they are re-extracted from the acid solution by means of ether after adding an alkali, thus furnishing quite pure alkaloid, at least sufficiently so for comparative results.

Process No. 2 consists of employing a mixture of petroleum benzine (19-vol.), alcohol (1-vol.), and concentrated ammonia ($\frac{1}{20}$ vol.) as a solvent in place of the Prollius' mixture, and removing alkaloids by direct extraction with dilute acid water, without evaporation of the solvent, and then treating the same as the acid solution in Process No. 1.

*Belladonna Leaves.*—Twelve samples assayed by process No. 1 were found to contain the following percentages of total alkaloids (atropine and hyoscyamine) by weight: 0.27, 0.41, 0.47, 0.30, 0.40, 0.50, 0.44, 0.36, 0.43, 0.50, 0.36, and 0.42; maximum, 0.30; minimum, 0.27; average, 0.40. Fifteen samples assayed in 1890 gave about the same maximum and minimum percentage, but the average was lower, being 0.33. The price of the poor quality being the same as that of the good, the cost of manufacturing standard preparations was materially increased.

The two alkaloids found in this drug probably differ somewhat in physiological and therapeutical action, hence we cannot expect to fix to a nicety the dose of the drug, but certainly a uniformity in the amount present is an important step toward more constant results.

*Belladonna Root.*— Five samples assayed by process No. 1 resulted as follows in percentage of total alkaloids: 0.9, 0.7, 0.48, 0.72, and 0.66; maximum, 0.9; minimum, 0.48; average, 0.69, the latter being higher than it was in 1889, when it was only 0.57, while in 1890 only three samples were assayed, yielding 1.1, 0.78, and 0.48 per cent. The sample containing the high percentage of total alkaloids possessed no special difference in physical appearance from the one assaying 0.48 per cent. Were this drug employed internally, untoward effects would necessarily be produced. The alkaloids obtained from the root are found to be chiefly hyoscyamine; less so in the case of the leaves.

*Calabar Bean.*—Five samples assayed by exhausting the drug with slightly acidulated alcohol, the alcoholic extract dissolved in acid water, and the alkaloids extracted with ether after the addition of an alkali, yielded the following figures: 0.21, 0.25, 0.25, 0.25 and 0.23 per cent. ether-soluble alkaloids; average, 0.24 per cent. This drug is quite uniform in alkaloids, but being hard to exhaust, great care must be exercised to obtain uniform preparations. The employment of ether in the final extraction of the alkaloids eliminates largely, if not completely, calabarine (the existence of which is even doubted by P. MacEwan,) leaving us physostigmine.

*Cantharides.*—Seven samples examined by the process given in the *American Journal of Pharmacy*, 1891, page 12 (A. P. A. Proceedings, 1890, page 504), by J. B. Nagelvoort, yielded cantharidin as follows: Trace, 0.77, 1.2, 1.06, 1.09, 1.0, and 0.8 per cent.; average, 0.97, excluding sample No. 1, which yielded a large amount of ash and little fat. The other samples yielded 7.8, 8.7, 5.7, and 5.8 per cent. ash respectively, Nos. 6 and 7 omitted. Powdered cantharides of the market vary in percentage of cantharidin, as shown by Martin in 1884 (A. P. A. Proceedings, 1885, page 199), who obtained from 0.25 to 1.06 cantharidin.

*Cinchona Calisaya.*—Eight samples submitted in 1890 and 1891, assayed by process No. 1, using modified Prollius instead of simple, yielded the following amounts of total alkaloids: 5.2, 7.2, 6.28, 6.48, 6.2, 5.6, and 5.68 per cent.; average, 5.3. Two samples of special select bark submitted assayed 10 and 8.5 per cent. total alkaloids. Previous to 1890, the samples examined varied more in alkaloidal strength, running as low as 3 per cent. and seldom above 5 per cent., the average for five years being 4.4 per cent.

*Cinchona, Pale.*—Seven samples examined since 1890 by process No. 1, modified, gave the following percentages of total alkaloids: 3, 2.66, 2.26, 3.15, 2.5, 2.9, and 2.55; average, 2.7 per cent. From 1885 to 1890, the samples assayed averaged 4.4 per cent. total alkaloids.

*Cinchona, Red.*—Eight samples assayed by same process gave the following percentages of total alkaloids: 7.9, 4.6, 5.12, 6, 7.8, 8, 8.3, and 6.3; average, 6.75 per cent. Samples 6 and 7 were guaranteed to contain

8.2 and 7.2 per cent. respectively. Samples examined from 1885 to 1890 yielded an average of 6.5 per cent. of total alkaloids.

*Coca Leaves.*—Thirteen samples assayed by process No. 2 yielded the following percentages, by weight, of ether-soluble alkaloids: 0.62, 0.69, 0.66, 0.40, 0.62, 0.54, 0.39, 0.42, 0.56, 0.6, 0.8, 0.65, and 0.98; average, 0.61, which is practically the same as obtained from twenty samples assayed from 1885 to 1890. These results substantially coincide with most reports on the valuation of coca leaves, some, however, obtaining as low as 0.25 per cent.

*Colchicum Root.*—Eleven samples assayed by process No. 1, estimating the final alkaloids by precipitation with standardized Mayer's reagent, applying the rule for correction as given in Lyon's Manual of Pharmaceutical Assaying, page 78, gave the following percentages: 0.5, 0.53, 0.54, 0.60, 0.57, 0.52, 0.52, 0.58, 0.58, 0.58, 0.53; average, 0.55 per cent. of colchicine, agreeing practically with seventeen samples assayed from 1885 to 1890.

*Colchicum Seed.*—Nine samples assayed by process No. 1 gave the following: 0.67, 0.67, 0.62, 0.75, 0.72, 0.66, 0.76, 0.79 and 0.8; average, 0.71 per cent. colchicine. From 1885 to 1890 the drug showed more variation in alkaloidal strength, assaying from 0.5 to 1 per cent. colchicine, the average of seventeen samples giving 0.67 per cent.

*Conium Seed.*—Nine samples assayed by process No. 2 (Proceedings of Michigan Pharmaceutical Association, 1890, page 19), weighing the alkaloid as a muriate, gave the following result: 0.50, 0.47, 0.56, 0.48, 0.75, 0.17, 0.91, 0.65 and 0.74 per cent. coniine; maximum, 0.91; minimum, 0.17; average, 0.58. Previous to 1890 the alkaloid was estimated by titration with a standard solution of phosphotungstate of sodium, which gave somewhat higher results than by the above process; greater variation, however, is shown as above. This being a highly toxic drug, too great care cannot be exercised in the manufacture of good fluid extract and the like.

*Gelsemium Root.*—Thirteen samples assayed by process No. 1, estimating the total alkaloids by precipitation with $\frac{N}{20}$, Mayer's reagent, each c.c calculated to represent 0.010 gramme alkaloid in a dilution of 1 : 200, gave the following figures: 0.74, 0.70, 0.74, 0.78, 0.61, 0.74, 0.60, 0.52, 0.54, 0.65, 0.80, 0.56 and 0.75 per cent. of total alkaloids; average, 0.67. Previous to 1890 the highest and lowest drug assayed yielded 0.84 and 0.44 per cent. respectively, with an average in twenty-four samples of 0.70. Many of the above samples were assayed by weighing the alkaloids instead of titrating, giving results 10 to 20 per cent. higher, which may be due to the tenacious character of gelsemic acid, rendering the alkaloids hard to purify. Further investigations are under way.

*Guarana.*—Eight samples assayed by process given in Lyon's Manual, page 98, yielded 3.95, 3.81, 3.8, 4, 4.3, 4.5, 4.45 and 4.5 per cent. caffeine;

average, 4.17. The records of five years previous to 1890 give an extreme variance of 3.75 to 4.5, with an average of 4.18 per cent. caffeine, showing uniformity in this high-priced drug. The accepted authorities on Materia Medica claim 5 per cent. of caffeine in guarana, which is high compared with the above and recent reports. Dr. Squibb obtained 4.38 per cent. of caffeine from a sample of a select drug.

*Ignatia Bean.*—Six samples assaged by Dragendorff's method for total alkaloids gave the following: 2.87, 3.21, 2.73, 3.2, 2.96 and 2.68 per cent.; average, 2.94 per cent., which agrees closely with eleven samples examined previous to 1890.

*Ipecac Root.*—Twenty-five samples, representing the entire root (cortical and ligneous parts), assayed since 1890, by Dragendorff's method, gave the following result: 3, 2.87, 3.74, 2.09, 2.75, 2.65, 2.4, 3.48, 2.8, 2.5, 2, 3, 3.4, 3.12, 2.7, 2.8, 2.9, 2.9, 2.5, 3.4, 2.6, 2.8, 3, 2.16, and 2.56 per cent. emetine; maximum, 3.74; minimum, 2; average, 2.73 per cent. The average of thirty samples examined previous to this was 3 per cent. emetine. These results are much higher than the average report of the examination of the powdered and whole drug in the market made by Pennington and Ransom (A. P. A. Proceedings, 1888, pages 165 and 352).

*Jaborandi Leaves.*—Eight samples assayed by Nagelvoort's modification of Flückiger's process (*Druggists' Bulletin*, 1889, page 14) gave the following amounts of total alkaloids (pilocarpine and jaborine): 0.3, 0.7, 0.72, 1, 0.76, 0.84, 0.91, and 0.8 per cent.; maximum, 1; minimum, 0.3; average, 0.75 per cent.

*Kola Nuts.*—Twelve samples assayed for caffeine and theobromine by same process employed for guarana yielded the following amounts: 0.72, 1.17, 1.12, 2, 1.71, 0.88, 1.52, 1.35, 1.28, 1.5, 1, and 0.9 per cent.; maximum, 2; minimum, 0.72; average, 1.26.

*Nux Vomica.*—Twenty-four samples assayed by Dragendorff's method gave the following: 2.8, 2.93, 2.85, 2.73, 3.22, 2.4, 2.7, 3, 2, 2.63, 2.99, 2.7, 2.73, 2.74, 3, 2.9, 2.82, 2.96, 2.98, 2.92, 2.64, 2.66, 2.56, and 2.92; maximum. 3.2; minimum, 2; average, 2.87 per cent. total alkaloids. The average of 22 samples examined previous to 1890, was found to be 2.6 total alkaloids. While this drug averages nearly 3 per cent. of total alkaloid, it is impracticable to more than half exhaust it; 1.5 per cent. total alkaloid both for fluid and for solid extracts seems to be the standard recommended by most researchers for these preparations.

*Gum Opium.*—Twenty-three samples of the moist gum examined since 1891, by Squibb's process, yielded the following amounts of pure morphine, completely soluble in fifty parts of fresh lime-water: 10.9, 12.1, 13.2, 11.5, 10.9, 12, 13, 12, 11.1, 13, 11.2, 10.4, 10.5, 11, 10, 10.3, 10.5, 11, 9.7, 11, 12.5, 12.5, and 12 per cent.; maximum, 13.2; minimum, 9.7; average, 11.4. The price of this article is now largely governed by the amount of morphine contained, and is generally in the ratio of its assay.

*Quebracho Bark.*—Eight samples assayed in a similar manner to the cinchonas yielded the following: 1.78, 1.4, 1.2, 1.72, 1.9, 1.75, 1.42, and 1.26; average, 1.55 per cent. total alkaloids.

*Stramonium Leaves.*—Eleven samples assayed by process No. 1, gave the following: 0.33, 0.46, 0.42, 0.35, 0.46, 0.32, 0.47, 0.45, 0.37, 0.46, and 0.43 per cent. crude total alkaloids; maximum, 0.47, minimum, 0.32; average, 0.38. Thirty one samples examined during the five years previous to 1890, yielded a maximum of 0.5, minimum, 0.22, and an average of 0.36 per cent.

*Stramonium Seed.*—Fifteen samples assayed by process No. 1, yielded the following amounts of crude total alkaloids: 0.40, 0.36, 0.36, 0.43, 0.45, 0.5, 0.36, 0.17, 0.22, 0.25, 0.31, 0.32, 0.24, 0.42, 0.38, and 0.48 per cent.; maximum, 0.5; mimimum, 0.17; average, 0.35. The maximum of samples examined previous to 1890, was 0.65, minimum, 0.3, and average, 0.4 per cent.

### U. S. PHARMACOPŒIA SALTS, ETC.

*Acetic Acid, U. S. P.*—Eight samples examined during three years resulted as follows: Found by specific gravity to contain 28, 27.2, 28, 29, 28, 26.3, 28, and 29 per cent, absolute acetic acid. Four proved to be pure by the requirements of the U. S. P.; three contained traces of empyreumatic compounds, reducing a small amount of potassium permanganate; and one a trace of sulphuric acid.

*Acetic Ether.*—Ten samples examined for the amount of pure acetic ether by the U. S. P. method of shaking with an equal volume of water, resulted as follows:

| *No.* | *Sp. Gr.* | *Reaction.* | *Odor of Residue.* | *Water and Alcohol.* |
|---|---|---|---|---|
| 1 | 0.905 | Neutral. | None. | 3 per cent. |
| 2 | 0.904 | Neutral. | None. | 3 per cent. |
| 3 | .... | Acid. | None. | 7.6 per cent. |
| 4 | .... | Neutral. | None. | 30 per cent. |
| 5 | ... | Neutral. | None. | 6 per cent. |
| 6 | 0.869 | Neutral. | None. | 26 per cent. |
| 7 | 0.897 | Neutral. | Bad. | 18 per eent. |
| 8 | .... | Acid. | None. | 16 per cent. |
| 9 | 0.902 | Acid. | None. | 14 per cent. |
| 10 | 0.907 | Acid. | None. | 10.9 per cent. |

The four samples losing less than 8 per cent. by volume do not agree with Dr. Squibb's experience, wherein he states that pure acetic ether, free from alcohol but not anhydrous, lost 12 per cent. by volume when shaken with an equal volume of water. He also states that prepared mixtures of alcohol, water and acetic ether differ in behavior toward this test from similar distilled mixtures, and as the exact solubility of acetic ether in water is questioned, the pharmacist should demand a product losing not more than 10 per cent. by volume by the present U. S. P. test.

*Aqua Ammonia, Concentrated.*—Fourteen samples examined since 1891, were found to contain the following amounts of ammonia gas: Nine, 28 per cent.; two, 29; two, 32; and one, 26 per cent., by weight. Four contained a trace of iron, seven developed a trace of empyreumatic odor, and four a distinct pink (anilin) upon supersaturation with an acid.

*Acid Hydrocyanic Dilute, U. S. P.*—Ten samples assayed by the U. S P. process resulted as follows: 1.9, 1.98, 1.66, 1.9, 1.7, 1.82, 1.7, 1.3, 1.5, and 1.8 per cent. absolute hydrocyanic acid.

*Apomorphine Muriate.*—Five samples examined by the U. S. P. test were found to be up to the requirements.

*Atropine Sulphate.*—Seven samples of foreign manufacture gave the following results:

| *No.* | *Melting Point.* | *Melting Point of Gold Salt.* | *Character of Gold Salt.* |
|---|---|---|---|
| 1 | 183° C. | ...... | Dull, lustreless crystals. |
| 2 | 184 | ...... | Dull, lustreless crystals. |
| 3 | 193.4 | 156° C. | Dull, lustreless, and bright shining crystals. |
| 4 | 196.5 | 153 | Dull, lustreless, and bright shining crystals. |
| 5 | 194 | 152 | Dull, lustreless, and bright shining crystals. |
| 6 | 183 | ...... | Dull, lustreless crystals. |
| 7 | 182.5 | ...... | Dull, lustreless crystals. |

Samples 3, 4. and 5 proved to be mixtures of hyoscyamine and atropine sulphate.

*Hydrochloric Acid, C. P.*—Six samples were found free from arsenic by Bettendorf's test, one contained a trace of iron; otherwise the seven samples were satisfactory as to purity.

*Hydrochloric Acid; Commercial.*—Ten samples examined resulted as follows: Seven free from arsenic by Bettendorf's test, one contained a decided amount, and two a trace.

*Sulphuric Acid; Commercial.*—Seventeen samples examined especially for arsenic by Bettendorf's test, and for lead, resulted as follows: Nine free, four containing (one a decided amount) arsenic, and four containing lead.

*Bismuth Subnitrate and B. Subcarbonate.*—Ten samples of subnitrate were found free from arsenic (Bettendorf's test) and lead, as well as four of the subcarbonate except one which contained a slight trace of arsenic.

*Calcium Hypophosphite.*—The examination of twenty-two samples resulted as follows: Only one dissolved to a perfect solution, nineteen produced a turbid solution 1:100, and two contained decided amounts of sulphate—one of the latter also an objectionable amount of phosphate or phosphite as indicated by the lead test. The quality of this article has improved within the last year or two.

*Glycerin.*—Forthy-four samples varied in specific gravity from 1.25 to 1.259, corresponding to 95 to 98 per cent. absolute glycerin; twenty-one were found free from iron, the remainder containing a trace to a decided trace of iron. Many of the samples gave a slight acid reaction, but none were found adulterated with glucose or cane sugar.

*Iron and Quinine Citrate, U. S. P.*—Eight samples assayed 12.8, 12, 11.4, 10.8, 11, 12.3, 12.5, and 11.9 per cent. of anhydrous quinine; average, 11.8 per cent.

*Iron Pyrophosphate, U. S. P.*—From 1890 to 1892, of ten samples examined by the U. S. P. test all were found to be up to the requirements, except one, which showed a mixture of pyro- and ortho-phosphate. Since 1892 samples have been examined by the magnesium test proposed by Mr. Stiegletz (*Bulletin of Pharmacy*, 1891, page 547), he having shown that the U. S. P. test misled one in an examination, sodium citrate giving a white precipitate not unlike the pyrophosphate. Of seven samples examined by the magnesium test, all have been found to contain more or less phosphate.

*Iron Phosphate, U. S. P.*—In the case of iron phosphate all samples examined by the U. S. P. and magnesium tests have been found to be satisfactory.

*Lactic Acid, U. S. P.*—Seven samples varied in specific gravity from 1.21 to 1.22, and from colorless to a pale yellow when treated with concentrated sulphuric acid; solubility of all perfect.

*Potassium Hypophosphite, U. S. P.*—Of nine samples examined, four were found entirely soluble, four to contain a trace of soluble calcium salt, and five gave a decided reaction for sulphate, none giving a reaction for phosphate.

*Potassium Bromide, U. S. P.*—Since 1890 four samples of crystallized salt, American manufacture, have been examined and all found to be free from sulphate, iodide, iodate, and chloride. These results differ from four samples recenty reported in Helbing's Pharmaceutical Record (*Pharmaceutical Record*, June 2, 1892) as containg 4.96 to 5.96 per cent. of potassium chloride, while two English samples contained only 0.13 per cent. During this time four samples of powdered or granulated potassium bromide have been examined and found to contain 4.3 to 7 per cent. potassium chloride, it being our experience to seldom find a powdered article pure and the crystals never impure.

*Potassium Iodide, U. S. P.*—Only three samples of the crystallized salt were examined since 1891, one containing 0.5 per cent. potassium bromide, another a trace, and the third free from it. Sample No. 2 contained some trace of carbonate, otherwise all samples were satisfactory to the U. S. P. requirements.

*Quinine Sulphate, U. S. P.*—One hundred and eighty-three samples examined for water-crystallization resulted as follows (number of samples

given in parentheses): (4) 6, (2) 6.5, (3) 7, (4) 8, (7) 9, (10) 8, (26) 11, (1) 11.5, (50) 12, (12) 12.5, (18) 13, (16) 13.5, (10) 14, (5) 14.5, (5) 15, and (3) 16 per cent.; average, 11.74 per cent. All of these samples responded to the U. S. P. test for purity, requiring from 7 to 7.5 c.c. 10 per cent. water of ammonia, except the three containing 16 per cent. of water-crystallization, which required 8.5 to 9 c.c. and which also were of American manufacture. The bulk of the samples examined were of German manufacture from cultivated bark of Holland.

*Sodium Hypophosphite, U. S. P.*—Ten samples were examined and found to contain from a faint trace to a decided amount (less than 0.5 per cent.) of sulphates; no phosphates; all but two a trace of calcium salt; and all completely soluble in water except one, which was only slightly insoluble.

*Sodium Bicarbonate, C. P.*—Five samples examined and three found free from sodium carbonate by the mercuric chloride test, and two containing less than 2 per cent.; otherwise pure.

*Detroit, June 1892.*

The following two papers was presented by Mr. Remington:

## ON FLUID EXTRACTS OF ERYTHROXYLON AND CINCHONA.

BY PROF. JOSEPH P. REMINGTON, PH. M.

*Query* 36. Are the officinal menstrua used in the fluid extracts of erythroxylon and cinchona such, that while thoroughlv exhausting the drugs of their desirable medicinal principles, they also retain these in solution ?

During the past winter the writer has been engaged in examining practically the various menstrua for the official fluid extracts, and the results of these labors may be summarized as follows: The menstruum for fluid extract of erythroxylon in the present Pharmacopœia contains more alcohol than is necessary; the best results were obtained from menstrua made by mixing 1 part of alcohol with 2 parts of water, both by volume. This made a fluid extract in which the very slight precipitate was found to be of inert matter.

In the case of the fluid extract of cinchona, the menstruum which yields the best results was one which was composed of 4 parts of alcohol, and 1 of glycerin, both by volume, finishing the percolation with a mixture of 4 parts alcohol and 1 of water, both by volume.

This menstruum yields a fluid extract, which though exposed for six months to a lower temperature than that prevailing at the time of its percolation, has not produced any precipitate whatever.

## ON THE PREPARATION OF GLYCERIN SUPPOSITORIES.

*Query* 20.—What is the best process for preparing glycerin suppositories?

BY PROF. JOSEPH P. REMINGTON, PH. M.

Glycerin suppositories are now very largely manufactured, and as is well known, they are used for producing a gentle laxative effect upon the

bowels. The problem which has confronted the pharmacist has been to combine a comparatively large quantity of glycerin with an inert body capable of giving the requisite solidity to the mass, and at the same time be soft enough to liquefy in the rectum. Very many formulas have been in existence, but in the writer's opinion, none give as much satisfaction as the following:

GLYCERIN SUPPOSITORIES.

| | |
|---|---|
| Sodium carbonate | 40 grains. |
| Stearic acid | 80 grains. |
| Glycerin | 1080 grains. |

Dissolve the sodium carbonate in the glycerin, add the stearic acid, heat carefully (preferably by the use of a water bath), until effervescence ceases; the solution is then poured into a suppository mold to make twelve suppositories. There is no necessity for cooling the molds with ice, although there is no objection to this in warm weather. As each suppository contains about 90 per cent. of glycerin, they must be protected from the action of moist air, which has a tendency to liquefy them. Several expedients are resorted to. Each one may be wrapped in tin foil, or quickly dipped in melted paraffine, or each one enclosed in a small glass vial without a shoulder and made for the purpose of holding one suppository.

The following paper by Mr. Wearn was presented by the Chairman:

## DARKENING OF SYRUP CONTAINING FERRI PHOSPHAS, U. S. P., DUE TO PARTIAL REDUCTION OF ITS FERRIC SALT TO FERROUS BY SUNLIGHT.*

BY W. H. WEARN, CHARLOTTE, N. C.

Supposing this darkening of syrups containing ferri phosphas, U. S. P., to be produced by the action of sunlight, I prepared a syrup containing two grains of ferri phosphas, U. S. P., to each fluidrachm, this being the maximum amount usually used in its preparation. A portion of the syrup was then bottled in one-ounce colored bottles of the following colors, viz., amber, blue, green, and white, and each of them placed under the direct action of the sun's rays.

The syrup contained in white bottle changed its color three different times during a period of nine hours, viz., amber, black, and chlorophyll green, the last named color being its permanent one, remaining so under the continued action of the sun's rays for weeks without change. From the sixth to the ninth hour, the time at which the green color is developed, a brisk evolution of oxygen gas takes place, usual tests for oxygen being used for its determination. The reserved portion of the syrup, which had

*Answer to Query No. 71. "What is the cause of the darkening of syrups containing phosphate of iron? How can this color change be remedied or prevented?"

not been exposed to the sunlight, was then tested for ferrous and ferric salts with ferro- and ferricyanide potassium, the characteristic blue color developing with both when added, showing both salts to be present. The exposed syrup then being tested by the same reagents responded to the test with ferricyanide potassium, but did not with the ferrocyanide potassium, showing the absence of the ferric salts which were present before exposure to sunlight. A solution was then prepared and treated by the same method with the same result.

This excludes any action that might be attributed to sugar as a cause, and demonstrates the fact that the change is due to sunlight.

In ferri phosphas, U. S. P., I find it to contain ferrous and ferric phosphate, with ferrous oxide and other by-products.

From the above facts I conclude that the sunlight destroys the molecule of ferrous oxide, thereby liberating its oxygen, and renewing chemical affinity of ferric phosphate, enabling it to appropriate the free atom of air, which produces ferrous phosphate and eliminates ferric salts entirely, as shown by preceding tests.

The following formula explains the power of sunlight to eliminate or reduce ferric salts existing in ferri phosphas U. S. P. to ferrous.

$$Fe_3(PO_4)_2Fe_2(PO_4)_2FeO + \text{Sunlight} = 2Fe_3(PO_4)_2 + O$$

By these experiments it is shown that the darkening of syrups containing ferri phosphas U. S. P. is due to the unfinished action of sunlight in its reducing power.

Syrup in colored bottles remained unchanged under the direct action of the sun's rays for 36 hours, or four times as long as that in white bottle, after which the same change took place. Hence it is seen that colored glass will protect it a reasonable length of time, and that nine hours' exposure to sunlight will give a syrup permanent under all conditions, of a beautiful chlorophyll green color free from ferric and richer in ferrous salts.

I would recommend that a concentrated solution of ferri phosphas be prepared and exposed to sunlight until green color is developed, and evolution of oxygen gas ceases, after which it may be made into syrup of desired strength.

Abstracts of the following papers were read by Mr. A. S. Stevens:

## THE RELATIONSHIP OF THE WHITE ALKALOIDS OF BERBERINE-BEARING PLANTS.

BY ROY D. YOUNG.

Berberine is now known to exist in sixteen or seventeen species of plants, found in no less than five distinct natural orders. It is generally assumed that a white alkaloid accompanies berberine in the greater number of these plants, but in only four of them has the presence of a color-

less alkaloid been established, each being distinct from the others. The white alkaloids found with berberine are coptine, oxyacanthine, hydrastine, and menispine.

The *Coptis trifolia* contains berberine and coptine, with resin, sugar, etc. The *Berberis vulgaris* contains berberine and oxyacanthine (also termed berbine, or venetine), with starch, albumen, gum, wax, fat, resin, and a little tannin. *Hydrastis canadensis* contains berberine and hydrastine, with starch, sugar, etc. *Menispermum canadense* contains berberine and menispine, with starch, resin, tannin, etc. These yellow plants are all inodorous and of bitterish taste, a taste imparted by both yellow and colorless alkaloid.

It has been apparently settled that papaverine, hydrastine, and narcotine are three bodies built upon a common structural type. In this type there is the closed carbon chain of benzene linked by a single side atom of carbon to the double ring of isoquinoline, thus: $C_6—C—C_9N$. The formula proposed by W. H. Perkin, Jr.,* for berberine, as a conclusion of his large research in this field, may be written in a condensed way as follows:

$$C_6.HH(OCH_3)(OCH_3)—C:(CH)—C_9N.H_2H_2HHO.(OCH_2).$$

For hydrastine,† the structural formula of Perkin would then stand as follows:

$$C_6.HH(OCH_3)(OCH_3):CO:CHO.C_9N.HCH_3H_2H_2HHO.(OCH_2).$$

Coptine was discovered by E. Z. Gross, in 1873. It has been reported present in coptis to the extent of 0.012 per cent. With sulphuric acid and manganese dioxide or potassium nitrate, it dissolves, giving sulphurous acid. With cold sulphuric acid alone it dissolves, and on heating a purplish color appears, like that afforded by hydrastine.

Oxyacanthine was discovered and investigated by G. Polex.‡ It is decomposed by mineral acids. Nitric acid converts it into oxalic acid, and a body resembling berberine, precipitated in yellow flocks by water (Polex). With iodic acid and a small quantity of water, it separates iodine, assuming a yellow or brown color (Whacker).

Hydrastine was discovered by Durand in 1851. It is present in hydrastis to the extent of 1 to 1½ per cent. of the dry root. Dissolved in hydrochloric acid, treated with potassium permanganate, it gives opianic acid (Freund and Will, 1887). Potassium permanganate in alkaline solution produces opianic acid and narcotinic acid, manganese dioxide and sulphuric acid cause the formation of hydrastinine and opianic acid, as also do barium permanganate and chromic acid (E. Schmidt and F.

* 1890; Jour. Chem. Soc., 57, 1003.

† Perkin, where last cited. Freund and Rosenberg, 1890: Ber. 23, 414.

‡ Arch. Pharm., [3] 6, 265.

Wilhelm*). Nascent hydrogen produces hydro-hydrastinine, if in presence of dilute sulphuric acid. Iodine and bromine enter into combination with hydrastine. Hydriodate of ethyl-hydrastine is obtained when hydrastine in alcoholic solution is heated with ethyl-iodide. Treated with an excess of potassium hydroxide and fused, the product slightly acidulated and distilled yields formic acid, while pyrocatechuic acid is left in the residue. These results were obtained by F. Powers, in 1884.†

Indications of a third alkaloid in hydrastis were found by A. K. Hale, in 1873,‡ and by J. C. Burt, in 1875.§ Lerchen, in 1878,‖ reported evidences of this body, which he named xanthopuccine. It was designated as canadine by E. Schmidt and F. Wilhelm, in 1888.¶ Its existence was denied by Powers, with the added authority of Lloyd, in 1884.** In further inquiry as to the precipitation which has given rise to the report of a colorless alkaloid beside hydrastine proper, the writer proceeded as follows: Pure hydrastine was dissolved with alcohol and subjected to the operation for obtaining "a third alkaloid" according to Hale. A nearly white precipitate was obtained, with crystallization after long standing. Then pure berberine was subjected to the same treatment, and a final precipitate was obtained after long standing. This precipitate was darker than the first precipitate of this alkaloid, that of berberine hydrochloride, and was very much smaller in amount than the corresponding final precipitate of the hydrastine. Mixtures of berberine and hydrastine, subjected to the same course of treatment, gave various-colored final precipitates. A mixture of berberine with coptine, or with oxyacanthine, or with menispine, treated with a slight excess of ammonia and set aside, after some time filtered and treated with large excesss of ammonia, yield additional precipitate.

Menispine was discovered by Professor Maisch in 1863.†† Its general reactions were reported upon by H. L. Barber,‡‡ in 1884. This year Mr. H. W. Birkmeier, working in this laboratory, has verified and somewhat extended Mr. Barber's work.

The following method was adopted by the writer after various trials, for the separation of menispine from menispermum canadense. The drug in moderately fine powder is percolated with water till the percolate is very

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* 1888: Arch. Pharm., [3] 26, 329; Jour. Chem. Soc., 54, 1212; Am. Jour. Pharm., 60, 633.

† Proc. Am. Pharm. Asso., 32, 448.

‡ Am. Jour. Pharm., 45, 247.

§ Am. Jour. Pharm., 47, 481.

‖ Am. Jour. Pharm., 50, 471.

¶ Arch. Pharm., [3] 26, 329; Jour. Chem. Soc., 54, 1212.

** Proc. Am. Pharm. Assoc., 32, 456; Lloyd: "Drugs and Medicines of North America," i, 138–142.

†† Am. Jour. Pharm. ‡‡ Am. Jour. Pharm., 56, 401.

nearly colorless and tasteless; the solution concentrated on a steam-bath, and made slightly acidulous with hydrochloric acid; the whole is then filtered, and to the filtrate hydrochloric acid, s. g. 1.12, is added in strong excess; after twenty-four hours standing the precipitate is filtered out, and to the filtrate water of ammonia, s. g. 0.960, is added in decided excess, and the mixture set aside for twenty-four hours. The resulting greyish-brown precipitate is filtered out, dissolved in much acidulated water, and the liquid, again filtered clear, is again precipitated with the ammonia in excess, standing ten or twelve hours. The precipitate is collected, dried over a porous plate in dry air, and powdered. The powder is then extracted with ether in a Soxhlet's extraction apparatus. The ether is distilled off, the yellowish residue is dissolved in slightly acidulated water, the solution when filtered is precipitated with ammonia. This is shaken out with ether three or four times, and the solvent driven off. Solution in the same acid, and precipitation in the same way, is repeated until the alkaloid is free from color, when it is to be washed with ice-cold water to free it from ammonium chloride. It is then dried over sulphuric acid for a number of days. In fixing upon this process experiments were made with other menstrua, continuous extraction with hot menstrua, and various macerations, as well as shaking out the first ammonia-charged solution with ether, none of these procedures proving expedient. Alcoholic extract of the drug did not yield as pure menispine.

The menispine prepared as above, in combustion, gave figures as follows:

| Calculated for $C_{32}H_{45}NO_6$. | | Found I. | II. | III. |
|---|---|---|---|---|
| C. | 71.24 | 71.16 | 71.34 | 71.23 |
| H. | 8.35 | 8.23 | 8.26 | 8.32 |
| N. | 2.59 | 2.56 | 2.63 | |
| O. | 17.81 | 18.02 | 17.81 | 17.79 |

In comparison with other white alkaloids of berberine-bearing plants, we have:

Hydrastine, $C_{21}H_{21}NO_6$

Oxyacanthine, $C_{16}H_{23}NO_6$ or $C_{32}H_{46}N_2O_{11}$

Menispine, $C_{32}H_{45}NO_6$

*Chemical Laboratory of the University of Michigan, June, 1892.*

## MENISPINE, ITS YIELD IN THE DRUG, AND ITS COMPARATIVE REACTIONS.

BY H. W. BIRKMEIER.

In estimating the amount of menispine in *Menispermum canadense*, I took 100 grams of the drug, and followed the method given by Mr. Roy D. Young, in the paper which this accompanies, but at the point where impure menispine is obtained, I extracted with alcohol, distilled off the

solvent, took up the residue with acidulated water, precipitated with the ammonia of ten per cent. strength, and then began to purify by shaking out with ether. I found the melting point to be 95°C. The yield was 0.0275 to 0.03 per cent. of the dry drug.

In results with reagents I found menispine to give quite nearly the reactions, and to have the solubilities reported by H. L. Barber, in 1884. (Am. Jour. Phar., 56, 401.) These reactions, extended in some instances, may be tabulated, as follows, in comparison with the reactions of hydrastine and oxyacanthine, these last being taken from the compilation and determinations of Henry B. Parsons in 1882. (Report U. S. Department of Agriculture for 1880; New Remedies, 1882, p. 84; Proc. Am. Phar. Assoc., 30, 434.)

| | Hydrastine. | Oxyacanthine. | Menispine. | |
|---|---|---|---|---|
| | | | Alcohol solution. | Acidulate Aqueous Solution. |
| Tincture Iodine. . | Dark red precip. | Dark brown precip. | Dark red precip. | Dark brown precip. |
| Iodine in K I . . | Nearly black precip. | Dark brown precip. | Dark red precip. | Dark brown precip. |
| Mayer's Reagent | Yellow precip. | Yellowish precip. | Yellow-white precip. | White precip. |
| Posphomolybdic acid. . . . . . | Brownish precip. not sol. in ammonia. | Brown precip. not sol. but dark blue with ammonia. | Yellow precip. sol. in ammonia. | Yellow precip. sol. in ammonia with green color. |
| Potas. Cadm. Iod. | White precip. | White precip. | Gray precip. | White precip. |
| Picric acid. . . . | Yel. pre. sol in acetic. | Yel. pre. sol. in acetic. | Yel. pre. sol. in acetic. | Yel. pre. sol. in much acet. |
| Platinic Chlor. . . | Yel. pre. sol. in HCl. | Yel. pre. insol. in HCl. | Yel. pre. sol. in HCl. | Yel. pre. sol. in much HCl. |
| Gold Chloride . . | Yel. pre. | Orange pre. insol. in HCl. | Orange pre. insol. in HCl. | Orange pre. sol. in much HCl. |
| Tannic acid. . . | Brown pre. sol in acetic, not in HCl. | Brown pre. insol. in acetic or HCl. | Whitish pre. insol. in dilute HCl or acetic | Whitish pre. soluble in acetic or dilute HCl. |
| $H_2SO_4$ conc. . . | Yellow, purple, to brown, then green. | Brown to purple, darkening. | Brown, fading. | |
| Sulphuric and Molybdic acid. | Deep green, to brick red. | Purple, slowly to green, then yellow. | Brown fading to yellow. | |
| Nitric acid . . | Orange-red, effervesc. | Orange-red, effervesc. | Effervescence, permanent yellow. | |
| $ZnCl_2$ fused. . . | Light yellow brown. | Chocolate brown. | Brownish yellow. | |

—*Chemical Laboratory of the University of Michigan, June,* 1892.

[By resolution of the Association passed at the last session (see page 60), the following two papers, presented by Mr. Kremers, were ordered to be printed with the other papers received by this Section. The material for the investigations described in the next paper, was procured with a grant from the Centennial Fund.

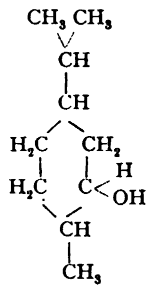
## THE MENTHOL GROUP.

BY EDWARD KREMERS.

### MENTHOL, $C_{10}H_{19}OH$.

*History.*—According to Flückiger and Hanbury (Pharmacographia, p. 482), menthol was first observed by Gaubius, in 1771, in oil of peppermint. Dumas,[1] however, in 1833, was the first to investigate it. He assigned to it the formula $C_6H_{10}O\frac{1}{2}$. Blanchet and Sell[2] in the same year, on the whole, confirmed Dumas' results. In 1838, Walter[3] ascertained its vapor density to be 5.62, whereas for the formula $C_{20}H_{40}O_2$ (old), he calculated 5.455. Walter[3-4] also was the first to prepare the hydrocarbon

menthene, $C_{10}H_{18}$, by the dehydration of menthol. Offenheim,[5] in 1861, first recognized the alcoholic character of menthol. Beckett and Wright[7] (1876) claim to have obtained a tetrabromide from menthene, which easily splits off hydrobromic acid with the formation of cymene. Moriyia,[8] in 1881, oxidized menthol, $C_{10}H_{20}O$ to $C_{10}H_{18}O$. Atkinson and Yoshida,[9] in 1882, prepared the same substance, and showed that similar relations existed between it and menthol as between camphor and borneol, by reducing menthone to menthol by means of sodium. The ketone character of menthone was demonstrated by Beckmann,[16] in 1889, who prepared its oxime. These experiments showed menthol to be a secondary alcohol. Its alcoholic character was also demonstrated by Arth,[11] in 1882, by the formation of menthyl urethane. Before oxidation with acid permanganate solution, Arth[12] claims to have obtained an acid $C_{10}H_{18}O_3$. He also obtained an acid of seven carbon atoms, $C_7H_{12}O_4$,[13] which probably is isopropyl succinic acid. Recently, Brühl[20] obtained cymene from menthol by careful oxidation with copper sulphate. Brühl[10] also showed by means of the coefficient of refraction that menthol does not contain a double bond. All of these facts substantiate the generally adopted structural formula for menthol.



*Properties.*—Menthol crystallizes in small, white, needle-shaped crystals which possess a characteristic peppermint odor. Like camphor, it sublimes at ordinary temperatures. The crystals melt at 42.2°, liquid menthol boils at 212°. Only the lævorotatory form is known thus far.[24]

When treated with metallic sodium, sodium mentholate,[5] $C_{10}H_{19}ONa$ is formed. By the action of phosphorus pentachloride[6] or of hydrogen chloride[5] on menthol, menthylchloride is obtained. Menthyl bromide[6] and iodide[6] are formed in a similar manner. The alcoholic character of menthol is furthermore shown by the formation of esters,[27] when treated with acid anhydrides or acid chlorides. Menthyl phenyl urethane,[14] and similar compounds have also been obtained.[28] When dehydrated, menthol yields an unsaturated hydrocarbon menthene,[29] $C_{10}H_{18}$. Upon oxidation with chromic acid mixture menthone, a ketone $C_{10}H_{18}O$, is obtained.[8-9-16] When oxidized with acid permanganate solution menthol yields oxymenthylic acid,[12] $C_{10}H_{18}O_3$, $\beta$-pimelic acid, $C_7H_{12}O_4$, probably identical

with isopropyl-succinic acid, is formed at the same time. Upon oxidation with nitric acid an acid of the formula $C_{10}H_{18}O_{9}$ has been obtained.

*Methods of Formation*—Menthol can be obtained by the reduction of menthone,[9, 16] and probably upon saponification of esters of menthol.[25] It has also been obtained by the reduction of pulegon.[35]

*Preparation.*—Menthol is almost exclusively obtained from oils of peppermint. The oil is subjected to low temperatures, at which the menthol crystallizes out in large part. The mother-liquid is removed with the aid of centrifugal machines, and the menthol is recrystallized. In recent years the menthone occurring in the mother liquors, has been at least in part reduced to menthol.[26]

*Occurrence.*—In Mentha piperita.[36]

In Mentha arvensis var. piperascens.[37]

In Mentha arvensis var. glabrata.[37]

## MENTHONE, $C_{10}H_{18}=O$.

Menthone was first prepared by Moriya,[8] in 1881, again by Atkinson and Yoshida[9] in 1882. Its oxime was prepared by Beckmann,[16] in 1889, who thereby demonstrated its character as ketone.

*Properties.*—Menthone is a thin, colorless liquid with a mild peppermint odor and a bitter taste. It boils at 205°. It is best known in its lævorotatory modification.[31]

In ethereal solution[16] or in petroleum ether,[9] it is reduced by metallic sodium to menthol. With hydroxylamine it forms a crystallizable oxime.[16] Its dehydration products have not yet been satisfactorily studied.[23]

*Preparation.*—To a solution of 60 g. potassium bichromate and of 50 g. sulphuric acid in 300 g. of water raised to a temperature of 30°, 45 g. of menthol are added. The mixture is well shaken and the temperature rises to about 55°. When the reaction has ceased, the menthone is separated by means of ether and distilled with water vapor.[16]

*Occurrence.*—Mentha piperita.[21]-[26]

Mentha arvensis var. piperascens } 7 and 8.
" " " glabrata }

## MENTHOXIME, $C_{10}H_{18}=NOH$.

*Properties.*—It crystallizes in long, slender needles, is soluble in alcohol, hot ether, chloroform, etc., also in sulphuric acid. It melts at 58°. It turns the ray of polarized light to the left. Menthoxime hydrochlorate is also lævorotatory,[32] like the menthone from which it is prepared.

When reduced with sodium in alcoholic solution, menthylamine[21, 23] is formed. With sodium it also yields an unstable compound.[16]

*Preparation.*—20 parts of menthone are dissolved in 2½ times its weight of alcohol, and to the solution 12 parts of hydroxylamine hydrochlorate and an excess of sodium bicarbonate are added. The mixture is

either allowed to stand for some time or it is heated for 15 minutes on a water-bath. The solution is then filtered and set aside to crystallize.[16]

### Menthylamine,[33] $C_{10}H_{19}NH_2$.

*Properties.*—Menthylamine is a colorless liquid having an odor of coniine. It is soluble to some extent in cold water, readily in alcohol. Its specific gravity is 0.8685. It boils at 204°. It is lævorotatory, like the menthol, its source.

Menthylamine readily absorbs carbon dioxide from the air with the formation of a crystalline carbonate.[21] The hydrochlorate, nitrate, sulphate and oxalate have also been formed.[34] It forms condensation products with aldehydes.[19]

*Formation.*—I. By the action of ammonium formate on menthol.[19]

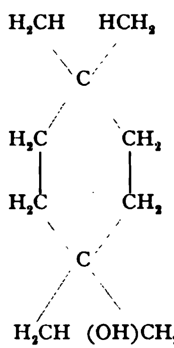
II. By the reduction of menthoneoxime.[21 23]

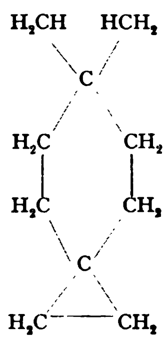
### Menthene, $C_{10}H_{18}$.

Walter,[1] 1838, appears to have been the first who has dehydrated menthol. By the repeated action of glacial phosphoric acid on menthol he obtained a hydrocarbon "*menthen*," $C_{20}H_{36}$ (old), a liquid boiling at 163°. The vapor density was found to be 4.93–4.94, the formula requiring 4.835. In 1839 Walter[2] continued his investigations, studying the behavior of various reagents on menthene.

In 1861 and 1864 Oppenheim studied the properties of menthene and derivatives. He showed the relation existing between menthol and menthene to be the same as that existing between ethyl alcohol and ethylene.[3]

In 1870 Hlasiwetz[4] published in connection with his study on the camphor group the following formulas for menthol and menthene, without, however, furnishing any experimental evidence in favor of these formulas.





Of late years menthene and derivatives have been studied by a number of chemists, and its natural occurrence in oil of peppermint has been rendered probable.[5] Several isomers of menthene have also been prepared, and one of these, a reduction product of dipentene, probably is identical with menthene.[6]

The structural formula of menthene is readily derived from that of menthol, and stands or falls with the latter. Although the physical and chemical properties of menthene have been the subject of numerous investigations, the results have not been altogether satisfactory, since all derivatives thus far obtained, like menthene itself, were liquid.

*Properties.*—Menthene is a thin, colorless liquid, with an odor resembling that of the paraffin hydrocarbons. Sp. gr., 0.8134.[22] Boiling point, 165° (bar. pressure 744 mm.[22]) Menthene prepared from laevorotatory menthol is dextrorotatory: $[\alpha]_D = +31.83°$.[22] Molecular refraction, $M_{N_a}$ 45.85, calculated for $C_{10}H_{18}$ 45.64. Molecular dispersion 1.30, calculated 1.04. The difference of 0.26 corresponds closely to 0.23, the average value of a double bond.

Menthene is an unsaturated hydrocarbon, since it combines with a molecule of HCl, HBr, HI, $Br_2$, $H_2$, NOCl, and probably with HCN. The dibromide, it would seem, can combine with two or more atoms of bromine, thus yielding a tetrabrom substitution product of a paraffin hydrocarbon, $C_{10}H_{18}Br_4$, which upon the removal of four molecules of hydrogen, yields cymene.[16] Cymene is also obtained by direct oxidation of menthene with copper sulphate.[17] Bromine also acts substituting on menthene, forming an unstable monobrom menthene, $C_{10}H_{17}Br$. When this is treated with moist silver oxide or with alcoholic potassa it does not yield a compound, $C_{10}H_{17}OH$, but a hydrocarbon, $C_{10}H_{16}$.[3] Chlorine also acts substituting on menthene; however, no definite products have been obtained thus far.[2] Cold nitric acid does not decompose menthene. By the action of fuming nitric acid a crystalline oxidation product, $C_{10}H_{18}O_9$, has been obtained by Yoshida. Menthol is stated to yield the same compound under similar conditions.

(2) *Preparation.*—50 g. menthol and 100 g. potassium hydrogen sulphate are heated in a strong flask connected with a reflux condenser on a paraffin bath for from six to eight hours. The mixture is then distilled with water vapor, the oily distillate is separated and dried with potassa. The dried oil is carefully fractionated.

(1) *Methods of Formation.*—I. Dehydration[23] of menthol: $C_{10}H_{19}OH = C_{10}H_{18} + H_2O$.

II. Upon removal of hydrohalogen from the halogen esters of menthol:[24] $C_{10}H_{19}X = C_{10}H_{18} + HX$.

III. Reduction of one or several terpenes: $C_{10}H_{16} + H_2 = C_{10}H_{18}$.

*Occurrence.*—Probably in oil of peppermint.

### MENTHENE HYCROCHLORIDE OR MENTHYL CHLORIDE, $C_{10}H_{19}Cl$.

Menthyl chloride can be obtained by the action of phosphorus pentachloride on menthol, or of hydrogen chloride on menthol or menthene. Hydrogen chloride gas is either allowed to act on menthol at 100° or passed into an ethereal solution of menthene.[19] Menthene can also be heated with hydrochloric acid in sealed tubes to 120°. Menthyl chloride

obtained from menthol is identical with menthene hydrochloride obtained from menthene.

Menthyl chloride is a faintly yellowish liquid, lighter than water, of a peculiar aromatic odor and soluble in methyl and ethyl alcohol, ether and oil of turpentine. It boils at 204° under decomposition. It is readily decomposed when treated with an alcoholic solution of potassa. It is a relatively stable compound,[13] inasmuch as it is not affected by silver sulphide, nor by potassium sulphocyanide. The decomposition it suffers with potassium hydrogen sulphide, and with ammonia, is not completed even after the solutions have been heated for 30 hours at 240°. The menthene resulting thereby always contains menthyl chloride. When boiled with water or when heated with silver acetate, menthyl chloride yields menthene. It is but slowly affected by metallic sodium at ordinary temperature, but when heated with the same to 250° for 24 hours it apparently yields a mixture of hydrocarbons $C_{10}H_{18}$ and $C_{10}H_{20}$.[20] When menthyl chloride is treated with bromine[13] it yields a compound of the composition $C_{10}H_{14}Br_3Cl$, which upon recrystallization from carbon disulphide can be obtained in the form of white crystals. It has a characteristic musky odor.

### Menthene Hydrobromide or Menthyl Bromide, $C_{10}H_{19}Br$.

Menthyl bromide results from the action of phosphorus pentabromide on menthol,[13] or by treating a solution of menthol in glacial acetic acid with bromine.[21] The reddish yellow liquid resulting in the latter case is separated, washed with water containing a little ammonia, finally with pure water, and then dried in a vacuum.

It is a clear yellow liquid, heavier than water, of a peculiar odor, and is freely soluble in alcohol, but insoluble in water.[21] It is unstable, decomposing when heated,[21] and behaves toward most reagents like the iodide.[13] When menthyl bromide is treated with bromine, several substitution products result. With the aid of carbon disulphide, however, hard shining needles of the composition $C_{10}H_{14}(Br_3)Br$ have been isolated.

### Menthene Hydriodide or Menthyl Iodide, $C_{10}H_{19}I$.

Menthyl iodide results from the action of phosphorus iodide and iodine on menthol. It is a heavy, slightly yellowish liquid. Treated with potassium hydrogen sulphide, menthene results. Alcoholic ammonia also splits off hydriodic acid. The reaction takes place in part in the cold, and is completed below 100°.

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References to Menthol, Menthone, Menthoxime and Menthylamine.

1 Dumas, 1883, Annalen, Bd. 6, p. 245.
2 Blanchet & Sell, 1833, ibidem, Bd. 6, p. 291.
3 Walter, 1838, ibidem, Bd. 28, p. 312.
4 Walter, 1839, ibidem, Bd. 32, p. 288.
5 Oppenheim, 1861, ibidem, Bd. 120, p. 350.
6 Oppenheim, 1864, ibidem, Bd. 130, p. 176.

[7] Beckett and Wright, 1876, Journ. Chem. Soc., Vol. 29, p. 2.
[8] Moriya, 1881, ibidem, Vol. 39, p. 77.
[9] Atkinson and Yoshida, 1882, ibidem, Vol. 41, p. 49.
[10] Bruehl, 1882, Annalen, Bd. 211, p. 160.
[11] Arth, 1882, Jour. Chem. Soc., Vol. 42, p. 1213.
[12] Arth, 1884, ibidem, Vol. 46, p. 755.
[13] Arth, 1886, ibidem, Vol. 50, p. 892.
[14] Leuckart, 1887, Berichte, Bd. 20, p. 114.
[15] Bouchardat & Lafont, 1889, Jour. Chem. Soc., Vol. 56. p. 276.
[16] Beckmann, 1889, Annalen, Bd. 250, p. 325.
[17] Bamberger & Lodter, 1890, Berichte, Bd, 23, p. 213.
[18] Bamberger & Berle, 1891, ibidem, Bd. 24, p. 3209.
[19] Wallach, 1891, ibidem, Bd. 24, p. 3992.
[20] Bruehl, 1892, ibidem, Bd. 25, p. 143.
[21] Andres & Andraef, ibidem, 1892, Bd. 25, p. 604.
[22] Berkenheim, 1892, ibidem, Bd. 25, p. 686.
[23] Negoworoff, 1892, ibidem, Bd. 25, Ref., p. 162.
[24] Menthol.

| | | Melting Point. | Boiling Point. | $[\alpha]_D$. |
|---|---|---|---|---|
| Dumas[1] | 1833 | 25° | | |
| Blanchet & Sell[2]. | 1833 | 27° | 208° | |
| Walter[4] | 1839 | 34° | 213-215° | |
| Oppenheim[6] | 1864 | 36° | 210° | —59° |
| Beckett & Wright[7] | 1876 | 42° | 212° | |
| Atkinson & Yoshida[9] | 1882 | 42.2° | 212° | $[\alpha]_j$=—59° |
| Beckmann[16]. | 1889 | | ............ | —50.59° |
| Urban | 1892 | 42° | ............ | —48.05° |

[25] Berkenheim[22] has obtained an isomer of menthol by the reduction of terpin hydrate with hydriodic acid, forming an analogue of menthyl iodide, which he converted into the acetic ester by means of silver acetate, and then saponified. The alcohol formed had a strong mint-like odor, but was liquid. He obtained a similar product upon saponification of menthyl acetate.

[26] Beckmann (Pharm. Rundschau, 1887, p. 266). The quantity of mother liquid can be reduced by removal of the menthone, one of its chief constituents. The menthone is converted into the oxime, and this is washed out with dilute sulphuric acid. Menthol is also obtained commercially by the reduction of the menthone from the residues.

[27] Esters prepared from menthol.

Menthyl acetate, " butyrate } Oppenheim,[6] 1861.

Menthyl benzoate,
Normal menthyl succinate,
Hydrogen menthyl succinate,
Normal menthyl orthophthalate,
Hydrogen menthyl orthophthalate, } Arth,[13] 1886.

[28] Menthyl urethane, Arth,[11] 1880.
Benzylidene menthyl urethane, Arth,[13] 1886.

[30] Menthone is possibly present in the oil of Eucalyptus hæmastoma. Schimmel & Co., Handelsbericht, April 1888, p. 20.

[31] Menthone.

| | | Boiling Point. | |
|---|---|---|---|
| Moriya[8] ........................... | 1881 | 204–205° | Inactive. |
| Atkinson & Yoshida[9]................ | 1882 | 206.3° | $[a]j = +214$ |
| Beckmann[16]. .................... | 1889 | 207° | $[a]_D = -28.46°$ |
| | | 208° | $[a]_D = +28.14°$ |
| Urban ............................ | 1892 | 205° | $[a]_D = -26.53°$ |

Moriya[8] obtained an optically inactive menthone by heating menthol in a closed tube for 10 hours with chromic acid mixture.

Atkinson and Yoshida,[9] by successive treatment with chromic acid mixture and heating to 135° obtained a dextrorotatory product.

Beckmann[16] obtained a dextrorotatory product by inversion of laevorotatory menthone with concentrated sulphuric acid. Heat and strong bases had a similar effect on menthone.

[32] Beckmann[16] prepared the hydrochloride of lævorotatory menthoxime by passing hydrogen chloride into an ethereal solution of the same. It is a crystalline powder. $[a]_D = -61.16°$.

A viscid liquid oxime, which was prepared from the dextrorotatory product resulting from thc inversion of lævorotatory menthone, turned the plane of polarized light to the left. $[a]_D = -4.85°$. Its hydrochloride $[a]_D = -6.25°$.

[33] Menthylamine.

| | | Boiling Point. | |
|---|---|---|---|
| Moriya[8] .......................... | 1881 | 185–190° | Inactive. |
| Wallach[19]........................... | 1890 | 208–209° | |
| Andres & Andraef[21]................... | 1892 | 204° | $[a]_D = -33.6°$ |
| Negoworoff[23]........................ | 1892 | 206–207° | $[a]_D = -9.21°$ |

The inactive substance obtained by Moriya[8] was formed by the reduction of a nitro-compound obtained by the action of nitric acid on menthol.

Negoworoff obtained menthylamine by the reduction of the viscid oxime prepared from the inversion product of lævorotatory menthone.

Andres and Andraef[21] prepared their menthylamine by the reduction of lævorotatory menthoxime with sodium. Beckmann[16] had failed in a similar experiment.

[34] Menthylamine hydrochlorate does not split off ammonium chloride upon heating. Wallach.[19]

[35] Beckmann, Annalen, Bd. 260, p. 32.

[36] Flückiger and Hanbury, Pharmacographia, p. 482.

[37] Franchet, 1883, Proceedings Am. Pharm. Ass., Vol. 31, p. 115.

### References to Menthene and its Hydrohalogen Derivatives.

[1] Annalen, 1838, Bd. 28, p. 312; from Comp. rend., T. 6, p. 72.

[2] Annalen, Bd. 32, p. 288; from Ann. de Chim. et de Phys., T. 72, p. 83.

[3] Annalen, Bd., 120, p. 352.

[4] Berichte, 1870, Bd. 3, p. 544.

[5] Andres, 1890; Jour. Chem. Soc., Vol. 58, p. 1428; from Chem. Centr., 1890, Bd. ii., p. 63; from Pharm. Zeitung für Russland, Bd. 29, p. 341.

[7] Moriya, 1881, Jour. Chem. Soc., Vol. 39, p. 81.

[8] Atkinson and Yoshida, 1882, ibidem, Vol., 41, p. 53.
[9] Brühl, 1892, Berichte, Bd. 25, p. 143.
[10] Walter, Annalen, Bd. 39, p. 290.
[11] Brühl, 1892, Berichte, Bd., 25, p. 103.
[12] Beckmann, 1889, Annalen, Bd. 250, pp. 335 and 358.
[13] Oppenheim, 1864, ibidem, Bd. 130, p. 176.
[14] Arth, 1883, Compt. rend., T. 97, p. 323.
[15] Oppenheim, 1864, Annalen, Bd. 130, p. 179.
[16] Beckett & Wright, 1876, Jour. Chem. Soc., Vol. 29, p. 2.
[17] Brühl, 1892, Berichte, Bd. 25, p. 143.
[18] Walter, Annalen, Bd. 32, p. 295.
[19] Oppenheim, Annalen, Bd. 120, p. 351.
[20] Atkinson & Yoshida, 1882, Journ. Chem. Soc., Vol. 41, p. 55.
[21] Moriya, 1881, ibidem, Vol. 39, p. 88.

| [22] | B. P. | Sp. gr. | Opt. Properties. | |
|---|---|---|---|---|
| Walter[2] | 163° | 0.851 at 21° | | |
| Oppenheim[15] | | | Dextrorotatory. | Obt. by the action of ammonia on menthyl iodide. |
| Oppenheim[15] | | | Opt. inactive. | Obt. by the action of zinc chloride on menthol. |
| Moriya[7] | 162–167° | 0.814 at 15° | Inactive. | |
| Atkinson & Yoshida. | 165–166° | 0.812 at 15° | $\alpha_j = +13.23$. | |
| Arth[14] | | | Dextrorotatory. | |
| Beckmann[12] | | | Dextrorotatory. | Obt. by the action of sulphuric acid on menthol. |
| Brühl[9] | 167.1 under 768.6 min. | 0.8064 at 20° 0.8060 at 24° | | |

[23] *Glacial phosphoric acid.* Walter[12] first obtained menthene by adding small quantities of glacial phosphoric acid to menthol contained in a retort until no further rise in temperature was perceptible. He then distilled the mixture, and the distillate was again subjected to the action of the dehydrating agent a second and a third time. He, however, obtained a large percentage of by-products.

*Zinc chloride.* Moriya,[7] in 1881, distilled menthol with an equal weight of zinc chloride in a retort, separated the oily distillate from the water and cohobated with fresh zinc chloride. Atkinson and Yoshida,[8] in 1882, also employed zinc chloride as dehydrating agent, and according to their statement but small quantities of polymeric substances were formed, but Brühl[9] claims that such are formed in considerable quantity.

*Phosphoric anhydride.* The dehydration with phosphoric anhydride takes place at ordinary temperature, with zinc chloride. after boiling for several hours.[11]

*Sulphuric acid.* Walter[10] also obtained menthene by the action of sulphuric acid on menthol. One part of menthol was heated moderately with two parts of concentrated sulphuric acid. The mixture separated into two layers, and the upper layer was treated six or seven times in the same way until no longer a color was produced by the sulphuric acid. It was then washed with water, and traces of sulphuric acid and moisture were removed with potassa. Beckmann[12] states that menthol is readily dehydrated with concentrated sulphuric acid and with boiling dilute sulphuric acid.

*Anhydrous copper sulphate.* According to Brühl[11] menthol is heated with anhydrous

copper sulphate for several hours in a flask with a reflux condenser. From the distillate traces of menthol are removed by distillation with metallic sodium from an oil bath.

[24] Oppenheim,[12] in his attempts to prepare menthyl sulphhydride and menthylamine by the action of potassium hydrogen sulphide and ammonia respectively on menthol iodide, obtained menthene. Menthyl chloride[13] behaves like the iodide under the same conditions, but the reaction is not complete. Menthene also results from the action of zinc ethyl upon menthyl chloride,[13] also by boiling the latter with water,[14] or by heating with silver acetate.

## Experimental Part.

### MENTHOL.

The menthol employed was quite free from oil and melted at 42°. It was strongly lævorotatory.

$$
\begin{array}{ll}
s & = 5.000 \text{ g.} \\
L \text{ (alc.)} & = 20.550 \text{ g.} \\
p & = 19.568 \\
d & = 0.8410 \\
t & = 20^\circ \\
l & = 1 \text{ dm.} \\
\alpha & = -7.908 \\
\hline
[\alpha]_D & = -48.05^\circ
\end{array}
$$

### MENTHONE.

The menthone was prepared according to Beckmann (Annalen, Bd. 252, p. 325). Before refractionation a large portion distilled between 205–206° under an atmospheric pressure of 738 mm. It was strongly lævorotatory.

$$
\begin{array}{ll}
d & = 0.894 \\
t & = 20^\circ \\
l & = 1 \text{ dm.} \\
\alpha & = -21.697^\circ \\
\hline
[\alpha]_D & = -24.27^\circ
\end{array}
$$

From another portion of menthone prepared by the same process fractions were collected at 205–205.5°, 205.5°–206°, 206°, barom. pressure, 738 mm.

| *Fraction 205–205.5°.* | *Fraction 205.5–206°.* | *Fraction 206°.* |
|---|---|---|
| $d = 0.8810$ | $d = 0.8810$ | $d = 0.8942$ |
| $t = 20^\circ$ | $t = 20^\circ$ | $t = 20^\circ$ |
| $l = 1$ dm. | $l = 1$ dm. | $l = 1$ dm. |
| $\alpha = -23.376^\circ$ | $\alpha = -22.982$ | $\alpha = -21.021^\circ$ |
| $[\alpha]_D = -26.53$ | $[\alpha]_D = -26.98^\circ$ | $[\alpha]_D = -23.50^\circ$ |

These figures show that the third fraction evidently contained some menthol, also that the rotatory power of the first two fractious can be but little if at all influenced by the presence of menthol.

### MENTHOXIME.

The oxime of lævorotatory menthone was also prepared according to

Beckmann. The recrystallized product melted at 57.5°, and was strongly lævorotatory.

$$
\begin{aligned}
S &= 0.5300 \text{ g.} \\
L\,(\text{alc.}) &= 14.6467 \text{ g.} \\
p &= 3.49\,\% \\
d &= 0.8229 \\
t &= 20^\circ \\
l &= 1 \text{ dm.} \\
\alpha &= -1.08^\circ \\
[\alpha]_D &= -37.61^\circ
\end{aligned}
$$

MENTHENE.

Since phosphoric acid anhydride and zinc chloride act as inverting agents on many terpenes, it was deemed advisable to use some other dehydrating agent in the preparation of menthene. Potassium hydrogen sulphate* was chosen for this purpose; 50 g. of menthol and 100 g. of potassium hydrogen sulphate are heated together in a strong flask connected with a reflux condenser on a paraffin bath for 6–8 hours at a temperature of from 180–200°. The mixture is then distilled with water vapor and the oily distillate is separated and dried with potassa. The dried oil was fractionated first in an ordinary distilling flask, then repeatedly with a tube after Lebel and Henninger.

After the second distillation the following fractions were the principal ones obtained:

165–166°
166–167°
167–168°
168–169°
169–170°

The largest fraction was obtained between 167–168°. The fractions above 180° were very small. The portion remaining above 200° solidified on cooling, and consisted chiefly of unchanged menthol.

Fractions 167–168° had a sp. gr. of 0.8164 at 20°, and in a 1 dm. tube turned the plane of polarized light 23.63° to the right. $[\alpha]_D = +28.94$. Upon refractionation under a pressure of 737 mm. it was resolved into the following fractions:

165-166°
166-167°
167-168°
168° +

The lower fractions were added to the corresponding ones previously obtained.

* Brühl has successfully employed anhydrous copper sulphate as a dehydrating agent. His article, however (Ber., Bd. 25, p. 103), came to notice only after potassium acid sulphate had already been employed with success.

| *Fraction 165–166°.* | *Fraction 166–167°.* | *Fraction 167–168°.* |
|---|---|---|
| d = 0.8140 | d = 0.8135 | d = 0.8165 |
| t = 20° | t = 20° | t = 20° |
| l = 1 dm. | l = 1 dm. | l = 1 dm. |
| $\alpha = +25.159°$ | $\alpha = +24.969°$ | $\alpha = +23.53°$ |
| $[\alpha]_D = +30.90°$ | $[\alpha]_D = +30.69°$ | $[\alpha]_D = +28.82°$ |

The lower portions were again fractionated, the largest quantity passing over this time between 165–166°, and was fairly constant at 165°. Smaller fractions were obtained between 166–167° and 167–168°.

*Fraction 165–166°,*

d = 0.8135
t = 20°
l = 1 dm.
$\alpha = +25.74°$

$[\alpha]_D = +31.64°$

This fraction was again distilled, nearly all passing over between 165–165.5°, and but a small quantity between 165.5–166°. Bar. pressure, 744 mm.

| *Fraction 165–165.5°.* | *Fraction 165.5–166°,* |
|---|---|
| d = 0.8134 | d = 0.8135 |
| t = 20° | t = 20° |
| l = 1 dm. | l = 1 dm. |
| $\alpha = +25.89°$ | $\alpha = +25.84°$ |
| $[\alpha]_D = +31.83°$ | $[\alpha]_D = +31.77°$ |

Inasmuch as the rotatory power of fraction 165–165.5° increased but 0.2, and its specific gravity was diminished by but 0.0001, the specimen may be considered quite free from menthol. Besides the very slight increase of the rotatory power shows that the change cannot very well be attributed to the action of heat, but to the removal of menthol.

Menthene, when pure, is a colorless liquid with an odor resembling that of the paraffin hydrocarbons. Its specific gravity, as stated above is 0.8134, boiling point 165° under pressure of 744 min. $[\alpha]_D = +31.83°$.

Upon combustion of a fraction which distilled between 167-168° yielded the following results: (Sieher.)

0.1664 gram substance gave 0.5250 $CO_2$ = 0.143181 C, and 0.1966 $H_2O$ = 0.021844 H.

| Calculated for $C_{10}H_{18}$. | Found. |
|---|---|
| C 86.95 p. c. | 86.04 p. c. |
| H 13.04 p. c. | 13.12 p. c, |

An attempt to prepare a hydration product of menthene according to Hempel's process for the preparation of terpin hydrate from pinene failed.

## MENTHENE NITROSOCHLORIDE, $C_{10}H_{18}NOCl$.

As already stated, the investigations of menthene have been more or less unsatisfactory heretofore because no crystallizable derivatives had been obtained. The nitrosochlorides, nitrosites and nitrosates have proven them-

selves very valuable in the isolation and investigation of the terpenes, and it may already be announced that a nitrosochloride promises to be of great importance in the study of a dihydroterpene of menthene. It is remarkable for its stability, and in this property possesses a great advantage over similar terpene derivatives. An attempt to prepare a nitrosite according to the terpinene-nitrosite method of Wallach proved unsuccessful. Menthene nitrosochloride is prepared as follows: 15 c.c. of menthene are dissolved in 15 c.c. of glacial acetic acid and 11 c.c. of ethyl nitrite. To this solution, kept cold in a freezing mixture, a solution of 6 c.c. of concentrated commercial hydrochloric acid in 6 c.c. of glacial acetic acid is added. The mixtures are constantly shaken. The white crystalline precipitate which results is separated by filtration, washed and dried on porous plates. The mother liquid is set aside and a second, and sometimes a third crop of nitrosochloride, can be obtained. The yield, however, has not been very satisfactory thus far. From 15 g. of menthene about 4 g. of nitrosochloride were obtained, and in another experiment but 27 g. from 150 c.c. of hydrocarbon. The crude nitrosochloride is purified by dissolving it in the smallest possible quantity of chloroform and by precipitating it with alcohol. The white crystalline powder is separated, washed with alcohol, and dried. Upon analysis it yielded the following results (Sieher):

I.—0.1920 gram substance gave 0.4101 $CO_2$ = 0.11184 C., and 0.1589 $H_2O$ = 0.01765 H.
II.—0.1998 gram substance gave 12 c.c. Nitrogen at 17° under pressure of 746 mm. = 0.0136737 g. N.
III.—0.2004 gram substance gave 0.1305 AgCl = 0.03227 Cl.

| Calculated for $C_{10}H_{18}NOCl$. | Found. I. | II. | III. |
|---|---|---|---|
| C 58.99 p. c. | 58.24 | —— | —— |
| H 8.84 p. c. | 9.19 | —— | —— |
| N 6.83 p. c. | —— | 6.88 | —— |
| Cl 17.40 p. c. | —— | —— | 16.18. |

Menthene nitrosochloride is best obtained thus far as a white crystalline powder that melts at 113° *without decomposition*, but decomposes with the evolution of gases at about 152°. It is very remarkable for its stability. A specimen kept for months showed no signs of decomposition. Even in contact with the acid mother liquid it does not decompose within several days, when kept cold. It is very soluble in chloroform, readily in ether, but sparingly in alcohol. Like the hydrocarbon of which it is a derivative, it is dextrorotatory.

$$
\begin{aligned}
&S = 1.9706 \text{ g.}\\
&L(\text{Chl.}) = 32.3141 \text{ g.}\\
&p = 5.74 \text{ p. c.}\\
&d = 1.4513.\\
&l = 1 \text{ dm.}\\
&t = 20^\circ.\\
&\alpha = + 1.147^\circ.\\
\hline
&[\alpha]_D = + 13.76^\circ.
\end{aligned}
$$

MENTHENE NITROL BENZYLAMINE, $C_{10}H_{18}\left\{\begin{array}{l}NO\\HN.CH_2C_6H_5.\end{array}\right.$

To prepare the benzylamine base, 5 g. of menthene nitrosochloride are heated with 5.25 g. benzylamine and about 30 c.c. of alcohol, in a flask connected with a reflux condenser on a water-bath for half an hour. The hot solution is filtered and set aside to crystallize. To convert any hydrochloride into the free base, the crystals are triturated with dilute aqueous ammonia, washed with water and dried. Recrystallized from alcohol it formed colorless rhombohedral crystals which melted at 106.5–107°. It is *optically inactive*. Upon analysis the following results were obtained: (Urban.)

I.—0.2012 gram substance gave 0.5509 $CO_2$ = 0.1500 C., and 0.1756 $H_2O$ = 0.01951 H.
II.—0.1817 gram substance gave 19.5 c.c. nitrogen at 22.5°, and under bar. pressure of 729 mm. = 0.0210915 g. N.
III.—0.1816 gram substance gave 19 c.c. nitrogen at 22 5°, and under bar. pressure of 729 mm. = 0.0205639 g. N.

| Calculated for $C_{17}H_{26}N_2O$. | Found. I. | II. | III. |
|---|---|---|---|
| C 74.45 p. c. | 74.65 p. c. | —— | —— |
| H 9.48 p. c. | 9.69 p. c. | —— | —— |
| N 10.21 p. c. | —— | 11.6 p. c. | 11.32 p. c. |

The hydrochloride of the base was prepared by passing dry hydrogen chloride into an ethereal solution. The salt separated as a white crystalline powder, which was recrystallized from alcohol.

A chlorine estimation according to Carius yielded the following results (Urban):

I. 0.1994 gram substance gave 0.0821 AgCl=0.02026 Cl.
II. 0.2027 gram substance gave 0.0856 AgCl=0.021126 Cl.

| Calculated for $C_{17}H_{26}N_2OHCl$. | Found. I. | II. |
|---|---|---|
| Chlorine 11.4 p. c. | 10.16 p, c. | 10.49 p. c. |

NITROSOMENTHENE, $C_{10}H_{17}NO$.

In order to prepare a dihydrocarvoxime analogous to the formation of carvoxime from limonene nitrosochloride or of nitrosopinene from pinene nitrosochloride, 5 g. of menthene nitrosochloride were digested with an excess of alcoholic potassa in a flask connected with a reflux condenser on a water-bath for half an hour. Potassium chloride was precipitated and the alcoholic solution was precipitated with water. The recrystallized compound, free from halogen, was analyzed with the following results (Urban):

I. 0.2003 gram substance gave 0.5212 $CO_2$=0.142145 C, and 0.1868 $H_2O$=0.02075 H.
II. 0.1974 gram substance gave 0.5195 $CO_2$= 0.14168 C, and 0.1848 $H_2O$=0.02053 H.
III. 0.1731 substance gave 18.25 c.c. nitrogen at 18° and under bar. pressure of 720 mm. = 0.01574 g. N.

| Calculated for $C_{10}H_{17}NO$. | Found. I. | II. | III. |
|---|---|---|---|
| C 71.85 p. c. | 70.96 p. c. | 71.77 p. c. | ——— |
| H 10.18 p. c. | 10.36 p. c. | 10.40 p. c. | ——— |
| N 8.38 p. c. | ——— | ——— | 9.09 p. c. |

Nitrosomenthene crystallizes from alcohol in colorless flat prisms which melt at 66–67°. It appears to be lævorotatory, thus turning the plane of polarized light in a direction opposite to that of the nitrosochloride, from which it is obtained. It corresponds in this respect to the carvoximes, which also turn the plane of polarized light in a direction opposite to that of the limonene nitrosochlorides from which they are obtained. The following estimation was made with an *impure* product:

$$
\begin{array}{lcl}
S & = & 0.750 \text{ gram.} \\
L(\text{Alc.}) & = & 10.2713 \text{ gram.} \\
p & = & 6.8 \text{ p. c.} \\
d & = & 0.8194 \\
t & = & 20^{\circ} \\
l & = & 1 \text{ dm.} \\
a & = & 0.207^{\circ} \\
\hline
[a]_D & = & -3.71^{\circ}
\end{array}
$$

In a note to the *American Chemical Journal* written in April, the following statement was made: "Menthene being a derivative of tetra-hydrobenzene, its first crystallizable derivative must be of considerable interest, especially as this must, no doubt, lead to many more. A study of these derivatives must also throw more light upon the analogous derivatives of the terpenes. The disputed question, whether menthene occurs in oil of peppermint or not, can now be answered; the identity of dihydrodipentene ("dihydrocynen") with menthene can also be established or denied. By splitting off hydrogen chloride from the nitrosochloride, dihydrocarvoximes may be expected to result."

As far as time has permitted these hopes have been fully realized. The possibility of at least one crystallizable nitrolamine has been established, and others have been made very probable. It will be of interest to prepare other bases and compare them with analogous members of the limonene derivatives. The nitrosomenthene also invites further investigation and comparison with the carvoximes and with nitrosopinene.

In conclusion, I desire to acknowledge my indebtedness to Mr. S. C. Urban and to Mr. F. A. Sieher, who have carried out the experimental part and who have also greatly aided me in the study of the literature on the subject. Mr. Urban has made all of the optical determinations.

*University of Wisconsin, June, 1892.*

## NOTES ON QUERIES.

BY EDWARD KREMERS.

In the chapter on chemical journals, Ernst von Mayer, in his "History of Chemistry," expresses his regret that the healthy criticism which permeated chemical literature during the first half of this century, has almost entirely disappeared during these latter decades. This is no less true of pharmaceutical literature. Our pharmaceutical journals are of a varied character. The scientific journals, with few exceptions, are characterized largely by the amount of material reprinted from European journals. Others devote page after page to trade interests and drug reports, with but a sprinkling of scientific or quasi-scientific matter. Still others are as gossipy as the rankest village newspaper. The proceedings of state associations contain lists of queries year after year. The occasional answers are often unsatisfactory, and the same query will appear in the following year. The discussions which follow sometimes occupy more space in print than the answer to the query, but seldom are of permanent value. As to pharmaceutical books, quiz-compends and the like need but be referred to. My intention is not to attempt to criticize all pharmaceutical literature, but only a single phase of the same. The queries already mentioned have been occasionally criticized, but apparently with little result. I do not expect that what I have to say will wipe them out of existence, nevertheless, I shall do as much as is in my power to oppose them, at least in their present form. The very existence of the customary queries is a confession of the poverty of thought and of observation in the ranks of the pharmaceutical profession. A pharmacist with but limited power of observation, and with moderate independence of thought, ought to stumble over some problem during the year which not only attracts his attention, but to the solution of which he may add something. The pharmacist who must be confronted with a query in order to test a commercial article for impurities is like the quasi-scientist who scans page after page of hand-books to find hap-hazard suggestions for an investigation. A true student will have his mind brim-full with problems. The question with him is not to find a query, but, which of these numerous problems am I competent to solve, and which problem is the more important at the present moment?

However, let it be granted that queries are a necessary evil to aid others in thinking—what can be said about the character of the same? In most cases they are like the queries of the question box. Some person has stumbled over a difficulty, real or apparent. He does not possess the intelligence or push to apply his thought, but finds it easier to frame his difficulty in the words of a query in order that some other person may answer the same. This repeats itself again and again, until the question-box is filled. It is then opened, and slip after slip is taken out blindfolded as it were, and every person is given an opportunity to answer as many or as

few queries as his convenience will permit. Such is at least the apparent character of the queries of our state associations, and even of our national association. Such a procedure is not only a confession of poverty of mental activity, but it fosters negligence and nonchalance of thought. That now and then considerable time and thought are given to the formulation of queries by individual members of committees I have no doubt, but even such well-meant efforts are often ill spent. It is no longer considered a disgrace to be ignorant of details on many, if not on most subjects. We do not expect the teacher of history to know every historical date or event, nor the mathematician to be able to solve every problem. We do, however, expect from each and every teacher that he knows what he is talking about, or what questions he asks. If, therefore, a committee is appointed to formulate a set of queries, these queries should be real questions not already answered, also questions that are answerable. Let me demonstrate this by a practical example.

Within recent years two colleagues at a school of pharmacy received the following queries with the request to answer the same: "What is the difference between red and white oil of thyme?" and "What is the chemical composition of copaiva balsam?" The answers were expected within three or four months. The first query could be answered within five minutes, as I shall demonstrate later; the second would probably require experiments for years to come to any satisfactory conclusion, however by no means final. It is not to be expected that every pharmacist knows the difference between red and white oil of thyme. However, a query the answer of which can be found in any handbook of pharmacognosy should not be placed on record in the Proceedings of the American Pharmaceutical Association. It is very easy to ask what is the chemical composition of copaiva balsam? or, what is the active constituent of this drug or of that plant? The student who is competent to answer such a question satisfactorily is not in need of the query. The question, What is the chemical composition of this, that or the other plant? is readily answered, after a fashion, by extracting the dried and comminuted plant with petroleum ether, ether, alcohol, dilute alcohol, water, etc., etc., by weighing the residues, by determining the percentage of ash, and even the composition of the ash. *But 99 out of 100 of such determinations are of no value whatever.* The chemical analysis of a plant involves more chemistry than most students have mastered, and more time than any one person is willing to give to the subject. In fact, the task is at present a chemical impossibility. The fact that such complicated queries are often put, clearly shows that the questioner himself has not grasped the significance of the query. Query 72 for this meeting, *e. g.*, appears very simple compared with the subject of plant analysis. Yet even this, after a few moments of reflection, will reveal itself as very complicated. The query reads as follows: "Is the addition of ethereal oil to compound spirits of ether de-

sirable?" etc. The question appears comparatively simple. However, as soon as you consider that ethereal oil is an unstable quantity, it becomes apparent at once that the question is not as simple as supposed. The same is equally true of innumerable other queries.

In order to substantiate these statements by a few demonstrations, I have requested two students of the School of Pharmacy to make a critical study of several queries, answers to which are expected at this meeting. In one or two cases the answers were brief, and were therefore furnished. The answers, however, are less offered as such than as incidents of an explanation of the simple character of the query, or to show that the question involved had already been answered. In the other instances no attempt whatever was made to answer the query, but to show that the query was improper, because it involved the previous evolution of at least several complicated problems.

*University of Wisconsin, July, 1892.*

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QUERY 63.—What is the difference between white and red oil of thyme?

As an answer to the above, Flückiger and Hanbury, Pharmacographia, p. 487, may be quoted: "Oil of thyme has a deep reddish color, but becomes colorless, though rather less fragrant, on redistillation."

Substantially the same is stated in the National and United States Dispensatories, "Die Real-Encyclopædie der gesammten Pharmacie," and other books within easy reach of most pharmacists.

LEO C. URBAN.

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QUERY 72.—"Is the addition of ethereal oil to comp. spt. ether desirable? In Germany the absence of this oil is demanded on the ground that its action is antagonistic to that of pure constituents of Hoffman's anodyne."

As similar queries have appeared heretofore, they will be considered together. They are:

Query 25, Vol. 8 (1859); "What are the changes which occur in officinal ethereal oil (U. S. P.) by keeping? can these changes be retarded?"

Query 16, Vol. 32 (1884): "Does commercial comp. spt. ether contain ethereal oil as required by the Pharmacopœia?"

Query 17, Vol. 32 (1884): "Cannot a more economical process be suggested for the manufacture of ethereal oil?"

Query 18, Vol. 32 (1884): "A paper on the determination of ethereal oil is desired."

Query 13, Vol. 33 (1885): "Does the commercial comp. spt. ether contain ethereal oil, as required by the Pharmacopœia?"

Query 14, Vol. 33 (1885): "Does the ethereal oil (oleum ethereum, U. S. P.) add any marked therapeutic value to Hoffman's anodyne?"

Query 15, Vol. 33 (1885): "A paper on the determination of ethereal oil (Oleum ethereum, U. S. P.) is desired."

The consideration of these queries involves the answering of two questions:

I. What is ethereal oil?

II. What is its therapeutic value?

In connection with the work of revision by the Pharmacopœial Commission, Dr. Power had occasion to prepare a specimen of ethereal oil, and has also made a careful study of the literature on the subject. The result of this critical study has been that Dr. Power believes:

I. That none of the commercial oil is made according to the process of the Pharmacopœia.

II. That the commercial article and the product obtained according to the pharmacopœial process differ considerably in chemical composition.

III. That neither of them are pure chemical compounds, but complex mixtures.

IV. That seldom will two products be alike, since slight differences in the methods of their preparation evidently effect considerable changes in their composition.

V. That, whereas, the so-called ethereal oil, obtained from the residue in the manufacture of ether, has been but imperfectly examined as to chemical composition, practically nothing is known of the chemical composition of the U. S. P. product.

Since we do not know what ethereal oil is, it is impossible to test for the same, and consequently the queries whether comp. spt. ether contains ethereal oil must remain unanswered—Q. 16, 1884 and Q. 13, 1885. For the same reason a quantitative estimation of the same is impossible—Q. 18, 1884 and Q. 15, 1885. Furthermore, as long as it remains unknown what ethereal oil is, a more economical process for its preparation cannot be devised—Q. 17, 1884. For the same reason it is impossible to say what changes occur in the officinal oil on keeping, as without knowledge of chemical composition changes cannot be traced, and consequently methods to retard them cannot be suggested.

The second fundamental question cannot be considered as long as the first remains unanswered. Even if ethereal oil were known to be a stable mixture, it would be an unscientific proceeding to attempt to ascertain its therapeutic effect.

The proper query on this subject, granted that queries are a necessary evil, would be the first fundamental question, *i. e.*

*What is ethereal oil?*

Since the yield of ethereal oil obtained according to the pharmacopœial process is but very minute, and since this product is of a complex nature, the question is by no means a simple one, at least from a practical standpoint.

HERMAN A. BRENNECKE.

QUERY 76.—"What is the percentage yield of salicylic acid from oil of birch?"

Prof. F. B. Power (Pharm. Rundschau, 1889, p. 283), having shown conclusively that oil of birch consists practically of pure methyl salicylate, the answer to the above resolves itself into a simple arithmetical problem.

Methyl salicylate, yielding upon saponification salicylic acid according to the following equation:

$$C_6H_4<^{OH}_{COOCH_3} + HOH = C_6H_4<^{OH}_{COOH} + CH_3OH$$

152 parts of the oil will yield approximately 138 parts of acid, or 90.78 per cent.

This will answer the question put by the Chairman of the Scientific Section at the meeting of the Association in 1890, during a discussion following a paper by H. C. C. Maisch on the "Ethereal Oils of Polygala Species" (Proc. A. P. A., vol. 38, p. 185). The statement was made at the time that oil of birch had been employed in doses of 30 m. with good results. This quantity was deemed the equivalent of an ordinary dose of salicylic acid.

Though such reasoning may be satisfactory as to the determination of the therapeutic equivalent, the chemical equivalent can be determined without experiment, and with much greater accuracy, from the equation.

30 m. of methyl salicylate, weighing 33.03 grains, will yield upon saponification about 30 grains of salicylic acid, whereas the ordinary dose of salicylic acid is from 15 to 20 grains.

In all probabilities, methyl salicylate undergoes a process of saponification before being absorbed by the system, consequently, acting more slowly, will require a relatively larger dose in order to produce an equivalent therapeutic action.

LEO C. URBAN.

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QUERY 80.—The only test stated to be reliable for terebene is its optical inactivity. If left and right rotatory turpentine are so mixed as to be optically inactive, how distinguish the mixture from terebene?

The above query naturally leads one to enquire what terebene actually is. In the process of its manufacture, concentrated sulphuric acid is made to act on oil of turpentine, with the consequent formation of a number of different terpenes, together with terpineol, borneol, cymol, etc.

The action of sulphuric acid on oil of turpentine may be represented by the following schedule:

$$\left.\begin{matrix} + \\ - \\ 0 \end{matrix}\right\}$$ Pinene (Oils of Turpentine).

I. Inactivation $\left\{\begin{matrix}\text{o Pinene} \\ \text{(b. p. } 155^\circ\end{matrix}\right.$

II. Inversion by means of hydration and dehydration with inactivation partially or complete. $>$ $\frac{\pm}{o}$ { Terpineols (b. p. 218°) } { $\pm$ Limonene (b. p. 175°); o Dipentene (b. p. 178°) } { Terpinene (b. p. abt. 180°) }

$>$ $\frac{\pm}{o}$ { Borneols (b. p. 212°) } { $\frac{\pm}{o}$ Camphene (b. p. 160°) }

III. Oxidation { Cymene (b. p. 175°) }

As only the fractions below 160° C. are employed, what is known as terebene can consist of nothing but optically inactive pinene, and any camphene which may be formed during the process, together with very small quantities of the higher boiling products, which have been but incompletely removed by fractionation, and which may therefore be considered as impurities.

According to the process of manufacture employed, very little camphene is likely to be formed, consequently terebene consists practically of inactive pinene.

Therefore, granting that terebene possesses any therapeutic action different from that of the pinenes, this difference must be due to such impurities as above mentioned.

The proper query then would be not how to distinguish a mixture of pinenes from an inactive product produced by chemical means, but rather, to which of the by-products its value is due.

This can only be ascertained by the determination of the therapeutic action of all these compounds. Having then decided upon the proper one, this may be prepared in the pure state, and thus be used to better advantage medicinally.

LEO C. URBAN.

Mr. Maisch stated that he had learned that several papers written by persons who are not members of the Association had been presented to the Section, and in order to authorize their publication in the Proceedings, moved that they be accepted and referred. The motion was adopted.

Next in order was the installation of the newly-elected officers of the Section. The chair appointed Messrs. Sloan and Caspari to conduct them to the platform.

Mr. Fennel, chairman-elect, was introduced and spoke as follows:

*Mr. Chairman, Gentlemen and Ladies of the American Pharmaceutical Association:* I call on the ladies as forming the best part of our Association, and entitled to recognition as members. There are moments in a man's life when language is inadequate to express our feelings. I assure you one and all that the compliment paid to me by electing me as presiding officer of the Scientific Section is highly appreciated. Accepting the position as Chairman of this Section involves the acceptance of obligations difficult to meet. I realize that the next meeting of this Association at Chicago is more than an ordinary one. The eyes of the whole civilized world will scrutinize and criticize the scientific labors presented before this body. The honor of this Association, as the sci-

entific and professional exponent of American pharmacy, is at stake. With the aid of my confreres I will meet these obligations imposed, and demonstrate to our brethren from abroad that American pharmacy stands second to none, and that the intelligence and enlightenment of American pharmacy is represented by the American Pharmaceutical Association.

Mr. Ryan, the Secretary-elect, was next introduced:

MR. RYAN: I sincerely appreciate the honor of this election, and while there may have been a mistake in the choice of your Secretary, I know that the selection of your Chairman could not have been more wisely made. I shall heartily co-operate with him in the work before us, and sincerely trust that our meeting next year, in point of quantity and quality of papers presented, may prove to have been unsurpassed in the history of the Association.

Chairman Fennel announced that Professor Caspari had been chosen, by the two members just installed, as the third member of the Committee on Scientific Papers.

Mr. Caspari briefly responded, acknowledging the honor conferred.

The report of the committee on the awarding of prizes for papers read at this meeting, was called for.

MR. HALLBERG: For about twenty years the Association has had one prize fund, but at Cincinnati, in 1887, it was proposed that some additional prizes be given for papers, so as to afford extra opportunities for the awarding of prizes to writers of papers. These prizes have never been given before, but there are now two papers which are eligible for them, and therefore a committee was appointed at the first session, which it was desired should report before the close of this session. This committee is now ready to report, and I was requested to make this statement on behalf of the committee.

MR. GOOD: The papers handed in that are supposed to compete for these prizes are to be marked, "For Competition." It is possible for us to award three prizes. There might be any number of papers marked for competition; but it so happens that there are only two so marked on this occasion. To the paper by Mr. Fennel the committee has awarded the first prize of $75, and to the paper by Mr. Arny the second prize of $50.

Mr. Hallberg occupied the chair, when a motion that the committee's report be accepted and approved was adopted.

Mr. Seabury moved that the words "For Competition" in the resolution passed at Cincinnati in 1887 be stricken out, and that all volunteer papers from any member of the Association shall be eligible for these prizes.

The motion was seconded by Mr. Stevens.

Mr. Eccles objected to the change proposed, and Mr. Hallberg requested Mr. Seabury to withdraw his motion. Mr. Ebert then moved that the resolution offered be laid on the table, which motion was carried by a vote of 49 ayes to 23 nays.

Mr. Rusby moved that no prizes be awarded under the resolution passed at Cincinnati, unless in the judgment of the Committee the paper was considered worthy of a prize.

The motion was seconded and adopted.

Mr. Whelpley moved that the Committee appointed to award those prizes report within six months after the meeting at which the papers are presented.

Mr. Maisch opposed the motion, on the ground that in case only one or two papers were handed in for competition, the decision could be readily made during the meeting, and if the Committee had a large number of papers to decide upon, the Section would grant such time as the Committee might require.

The motion of Mr. Whelpley was lost by a vote of 20 ayes and 35 nays.

The minutes of the third session were now read and approved, after which the Section adjourned.

CHAS. T. P. FENNEL, Secretary *pro tem.*
F. G. RYAN, Secretary.

# SECTION ON PHARMACEUTICAL EDUCATION AND LEGISLATION.

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FIRST SESSION—MONDAY MORNING, JULY 18.

The Section was called to order by the Chairman, A. B. Stevens, at 10:30 o'clock. In the absence of the Secretary, Mr. L. C. Hogan, Mr. C. A. Rapelye was appointed Secretary *pro tem.*

The Chairman read the following address:

At the last meeting of this Association, the Committee on the President's Address recommended that complete statistics of the various colleges and schools of pharmacy be collected, and the Association deemed the object of sufficient importance to warrant the appropriation of fifty dollars, to aid the Secretary of this Section in the prosecution of the work. The Secretary deserves much credit for the energy and forethought with which he has conducted his work, but the work itself is of such a nature that to make it most valuable, he must have the hearty co-operation of all institutions teaching pharmacy. How fully this co-operation has been given, will be seen on the reading of the Secretary's report. The value of this report to the pharmacists of the country largely depends upon the stimulating effect it may have upon the various colleges and schools of pharmacy. The way to elevate pharmaceutical education is to lay a firm and generous foundation by requiring a thorough preliminary education. Nothing less than a diploma from a reputable high school or its equivalent examination should be accepted. I can but feel that the practical experience insisted upon by so many colleges of pharmacy is of necessity incompatible with higher preliminary education, as the very time which should be spent in school in careful mental training, is spent in a store in cleaning pill-tiles, washing bottles, etc.

While State laws may tend to elevate the standing of Pharmacy as a whole, and thereby benefit the public by securing better service in some cases, I can but incline to the belief that they lower rather than elevate the standard of pharmaceutical education, and that the certificate of the State Board is regarded by many as equivalent, if not superior, to a reputable diploma. In other words, they seem to think that to comply with the State law in as easy a manner as possible is preferable to a thorough education. Therefore, they obtain some "quiz compend" and (to use their own word) "cram" for the State Board examination. Otherwise they seek some college offering a short course, which gives them some hurried preparation for it, or possibly they take the first year's work in some reputable college which abundantly answers the purpose. Gentlemen, I ask you, is this the manner in which a young man should fit himself to accept the grave responsibilities of the profession of pharmacy? Does human life demand no better preparation for its safety than this?

The effect alluded to *may* be only temporary, as the result of recent laws. Let us hope that the younger members of the profession will see that graduates of reputable colleges are preferred by employers, and from this, if from no nobler motive, seek thorough professional preparation.

During the present term of office your Committee has been asked by Mr. Chas. E. Reynolds to favor "A Bill to raise the professional standing of the apothecaries of the U. S. Navy." Your Committee wrote to the Secretary of the Navy and to the chairmen of the Committees of both houses having the bill in charge, and received a reply from the Navy department, not recommending the pending bill. It is evident that Article One, requiring the removal of present incumbents, defeated the bill. Had they only asked for examination of future applicants, the bill might have been more favorably received.

Since our last meeting a decision of the Supreme Court of the State of Michigan has been rendered that has such a strong bearing upon portions of almost all of our state laws, that I have deemed it of sufficient importance to have it presented to this Association and printed in the Proceedings, as a guide to future legislations and to aid in the enforcement of existing laws.

Your Chairman has purposely refrained from touching upon the present condition of education or legislation, as statistics will be given by the Secretary. Like my predecessor, I would recommend that the present Secretary be continued in office, for the reason that he thoroughly understands the nature of the work to be accomplished and has performed the work during the past two years in a most worthy manner.

## The following are the documents referred to in the Chairman's address:

A BILL to raise the professional standing of the apothecaries of the United States Navy.

1. Wherever the rate of apothecary in the United States Navy is now filled by a person holding neither diploma from a recognized college of pharmacy of the United States, nor certificate of examination from a State or County Board of Pharmacy, the said rate shall be declared vacant.

2 Hereafter, any person accepting the position of apothecary in the United States Navy, or acting in such capacity, must have graduated in a recognized college of pharmacy of the United States, save and except such as have served in said rate while holding Certificates of Examination from either State or County Boards of Pharmacy.

3. All prior acts conflicting with this are annulled.

4. Resolved that this Act shall take effect immediately.

NAVY DEPARTMENT, WASHINGTON, *February* 26, 1892.

*Gentlemen:* Referring to your letter of the 18th instant, relative to S. 1369 and H. R. 5096, to raise the professional standing of the apothecaries of the U. S. Navy, I have to state that, before the receipt of your letter, a copy of H. R. 5096 was referred to the Department, with a request for an expression of its views upon the advisability of the legislation proposed, by Hon. Jacob A. Geissenhainer, of the Committee on Naval Affairs, and that the Chief of the Bureau of Medicine and Surgery, in response to an inquiry from the Department on the subject, submitted the following report, viz.:

The Bureau cannot recommend the passage of the enclosed bill. It would summarily dismiss a large number of apothecaries who are entirely competent, and who are doing faithful service. Many of them have been in the naval service for years, and it would be difficult to supply their places at the rate of pay allowed, if the Medical Department was limited to a certain class from which alone appointments could be made.

The present laws and regulations governing the appointment of apothecaries are entirely adequate for the purpose, and additional legislation is not recommended.

The above report was, on the 20th instant, transmitted to Mr. Geissenhainer, with the concurrence of the Department.

Very respectfully, B. F. TRACY,
*Secretary of the Navy.*

Messrs. A. B. STEVENS and L. C. HOGAN, American Pharmaceutical Association, Ann Arbor, Mich.

The acting Secretary read Secretary Hogan's report on Schools of Pharmacy, with the exception of the voluminous statistics appended thereto.

MR. HALLBERG: If I remember correctly, the circular sent out by the Secretary involved some queries which many colleges would not care to answer, such as questions relating to the amount of instruction measured by the cord or yard, the number of hours, etc. I can see where the statements made by the institutions would be incorporated in a report of this kind without any question by the Secretary, and probably printed as reported, and thus apparent advantages would be given to some institutions as against others. That is an unfortunate condition. Of course, the Association desired to have some one undertake the work of compilation, and to avoid opportunities to make a great showing for some as against other perhaps equally worthy institutions. Perhaps it is impossible to prevent this. At the same time, I would like to know what goes into the report of the proceedings.

MR. WHELPLEY: As I understood the object of this report, it was not to give the colleges of the United States an opportunity to compare themselves with each other, or to array others at inferior positions with themselves, but for the purpose of summing up the status of pharmaceutical instruction in the United States, so that we could understand, for instance, what attention is given to the teaching of pharmacy as a whole in the United States.

MR. REMINGTON: I am perfectly willing to trust to the Committee on Publication, who are charged with taking care of the interests of this Association. I know they will cut out all matters which reflect upon the pharmaceutical education of any institution in the United States, and I think if there is any tendency in that report to advertise any individual college at the expense of others, the Committee will so amend it as to make it satisfactory, and thus attain the object which is sought.

MR. EBERT: I had that report in my possession, and having read it, find that he has been very careful indeed to give no college any advertising; he simply states facts of what they may possibly be doing. I think that the Publication Committee will find nothing objectionable in the report. The Secretary has called my attention to the fact that several institutions from whom he received information, made an effort to bring their respective institutions into as good a light as possible for business reasons, and thus obtain some notoriety, but he eliminated such remarks.

MR. HALLBERG: I have the highest regard for the efficiency of Mr. Hogan, and as far as he is concerned, this report has been prepared to the best of his ability.

MR. GOOD: It ought to be possible to make a summary of the report, and I think it should be referred to the Committee on Publication for that purpose. It has been very aptly remarked, of what value is it if we do not summarize it?

MR. MAISCH: Who is to prepare such a summary? If you refer it to the Committee on Publication, I can tell you beforehand that the Secretary would have to do the work, and he has enough to do in getting the proceedings out at the proper time. It seems to

me that Mr. Hogan has been giving so much time to this work that it would be comparatively easy for him to prepare a summary, and then submit it to the Committee on Publication.

MR. GOOD: I move that the report be referred to the Committee on Publication, and that Mr. Hogan, the present Secretary of the Section, and the Chairman of the Committee on Publication, make a summary of the report on college education, and prepare it for publication.

The motion was seconded and carried.

The acting Secretary presented the report of the Committee on Legislation, which on motion of Mr. Canning was received and referred for publication.*

Mr. Simon read the following paper:

## THE THREE YEARS' COURSE IN COLLEGES OF PHARMACY.

BY PROF. W. SIMON.

Answer to Query 15. Would not the pharmaceutical education of our young men be greatly improved, and the professional status of the apothecary be materially elevated, by increasing the time required at the Colleges of Pharmacy to three sessions (of six months each), the last of which should be devoted entirely to Physiology and Therapeutics?

In order to answer this query properly it must necessarily be divided into the two questions it implies, viz.: Is an increase of the time of study from two to three years desirable? And, Are physiology and therapeutics the proper studies of a pharmaceutical student in this third year, which is to be added to the curriculum?

We are so fortunate as to live at a period when progress is the watchword of civilized nations, when improvements in all spheres of human activity follow one another with a rapidity unknown in former times, when the cry for education, and especially for better, for higher education, is heard on all sides.

Pharmacy, and more especially pharmaceutical education must, necessarily keep pace with this onward march of all branches of science, art, and culture. Every proposition made which implies a forward step in this direction must be hailed with delight, and it is for this reason that I gladly raise my voice to speak in favor of extending the course in Pharmaceutical Colleges from two to three years.

In advocating this extension I am justly expected to give my reasons for doing so. It might be said that the colleges have done very well so far with a two years' course, and I admit that, in one sense, they have. The graduates of all good colleges are men in whose care the prescription counter can be placed with safety, who can prepare the more common chemical and pharmaceutical preparations with more or less skill and accuracy, who

* The two reports, owing to their length, will be printed in an appendix to these minutes.—EDITOR.

know how to use the reagents commonly applied in analytical methods, and who have a fair theoretical knowledge of the principal branches taught at the institutions, viz.: of pharmacy, botany, materia medica, and chemistry.

It might be said that such a knowledge should be amply sufficient for the pharmacist, but we must not forget that we live in a progressive age, that we cannot possibly stop, but must advance. The colleges have done this; they have added practical laboratory work, extended the time for lectures, and many have raised the general standard of examination nearly every year.

Yet still more must be done, still more be accomplished, in order to keep pace with the advances made everywhere. As the sciences progress from which the pharmacist draws the knowledge of the materials he is dealing with, so pharmacy must necessarily progress also.

A more exact and more accurate knowledge of analytical, qualitative and quantitative, gravimetric and volumetric methods is desired; a greater familiarity with microscopical examinations is expected; a more thorough knowledge of all details pertaining to the methods of preparing and testing pharmaceutical agents is demanded.

But all this cannot be accomplished in two short sessions of six months each. It might be said that the sessions could be extended to at least eight months' duration, and I surely would look upon this change as at least a compromise in the right direction. At the same time it cannot be denied that a third session of six months would benefit the student far more than the two or even three months added to each of the two sessions, because the six intervening months give the student time to digest and absorb the knowledge previously imparted.

It might also be said that a greater number of hours should be devoted to college work during the sessions. Here again I place myself on record as being in favor of this proposition, and for years past have claimed that students of pharmacy should devote *all* their time to college work during the course, and not attempt to be clerks in stores and students of colleges at the same time.

But this very fact, that a majority of students still combine work in the store with the duties in the college, and that it is difficult to overcome this long-established custom at one stroke, renders it more necessary to add the third year to the curriculum of pharmaceutical colleges.

The association of medical colleges of the United States, as well as the dental schools, have adopted a three years' course, and in my opinion it is only a question of time when the pharmaceutical colleges will have to do the same.

Having thus answered the first part of the query most emphatically in the affirmative, I can turn to the second part, which asks whether the third year should be devoted entirely to physiology and therapeutics. To this I answer with equal emphasis: No.

I certainly would like to see some physiology and somewhat more of therapeutics taught in our colleges, than is done now; but I desire to have first of all, the pharmacist thoroughly equipped with that knowledge which is most essential to his calling.

The division of labor between the physician and the pharmacist, points out clearly the field each one has to cultivate. The manufacture and the dispensing of medicines is the proper field of the pharmacist, and for this he neither requires a study of the physiological actions, changes, and processes in the animal body, nor does he necessarily require a detailed knowledge of the therapeutic action of the medicines he dispenses. If he can guarantee *with absolute certainty* that he furnishes *exactly* what the physician prescribes, he is an able, a thorough and competent pharmacist in the best sense of the word, and it is by far better to be master of one art, than to be a jack of two trades.

Yet how many pharmacists are there in the whole United States who can give the physician and the patient the guarantee that they furnish what is called for? This guarantee implies that the druggist himself has either prepared or at least examined the article he furnishes, and not that he relies simply on the guarantee of the manufacturer or dealer.

I, for my part, would much rather take the guarantee of a reliable manufacturer than that of the average pharmacist, but this is the very point at issue.

To illustrate more forcibly what I mean, let me use an example. The majority of druggists, and surely all the younger graduates in pharmacy, know the process of assaying opium, *i. e.*, they can describe it. Much smaller is the number of those who can perform the operation practically, even if they have been taught how to do it. But how many of the pharmacists (including all the graduates) are capable of making a *correct* opium or cinchona bark assay? I boldly claim that there is to-day in the whole United States not one pharmacist in a hundred, who can make a *correct* determination of morphine in opium, or of quinine in cinchona bark.

It might appear that the colleges are to be blamed for this state of affairs, but let us look at the question in the proper light. Let us assume that the student works in the laboratory twelve hours a week. In the first six months he can do no more than to master qualitative inorganic analysis, and to perform a sufficient number of simple experiments to obtain a general knowledge of and familiarity with chemical operations. In the second year quantitative work is commenced, but every teacher knows too well how many months pass before the student is capable of making the most simple gravimetric determinations correctly. Volumetric methods are then taken up, and finally the more difficult processes of assaying opium and cinchona are tried. The time, however, is far too short to familiarize the student *thoroughly* with these processes.

I admit there are always some students who devote their whole time to college work, and are in the laboratories from early morning till late in the evening, with the exception of the hours taken up by lectures and other college work. But these students are the exceptions, and even of them I can hardly say that they are perfectly familiar with *all* the operations, the performance of which is directed by the U. S. Pharmacopœia.

These facts would surely indicate that the time has not arrived yet when we can introduce the study of physiology, or of other auxiliary branches, in our pharmaceutical schools. There is too much material left in the special field of pharmacy which cannot be properly taught to the student now, because there is no time for it.

Let the three years' course be established by all means, but let the third year be devoted to work in the pharmaceutical and chemical laboratories, to microscopy, pharmacology—in short to a good, thorough, practical training in all that strictly pertains to the science and art of pharmacy.

If this were done, we may safely assume that the conditions would be brought about which the committee of this Section had in view when it placed this query before the Association, viz.: the education of our young pharmacists would be greatly improved, and another step forward would be taken in the right direction.

MR. REMINGTON: Dr. Simon has so thoroughly, comprehensively and clearly set forth his answer to this question that I feel there can scarcely be any doubt about the correctness of his position. There is great need for extending the courses of instruction in our colleges of pharmacy. We must go forward; we cannot take a backward step. Pharmacy is progressing at such a rate that it is absolutely necessary for us to go ahead and have three courses, and even this will not enable us to do more than give to pharmacy the attention that it deserves. I merely make these remarks for the purpose of endorsing the sentiments that have been expressed, and to attest my approbation of this very valuable paper. And now, Mr. Chairman, I want to introduce to this meeting a gentleman who is a professor in another college of pharmacy, whom most of us know by reputation. Many of you have shaken his hand for the first time, and as a new member, I have asked him, on this occasion, to give us his opinion and his views. I allude to Professor Elliott, Professor of Chemistry in the New York College of Pharmacy.

MR. ELLIOTT: Mr. Chairman: The flattering introduction of Professor Remington is perhaps somewhat undeserved. I am a practical teacher, and can therefore speak in most hearty sympathy for the paper of Professor Simon. When we stop to think of the time doled out to us to educate the young men in, it is simply miserable. We usually get, in New York, three days a week for six months, and in that time of twelve months (practically it is six months' work) we have to teach what would take about three years in a medical college on parallel subjects, and in scientific institutions at least four years. It is true that we cannot make practical analytical chemists of our students, but what a minute epitome we have to give them! They hardly get a taste of analytical work. I heartily agree with Professor Simon that we want three years at once, of six months each, and in a few years we will want four. Our best teachers to-day are worried with their work, in order to concentrate into such a small space of time, and the main thought of a good, conscientious teacher to-day is, how to do the best in the time allotted. Regarding therapeutics and physiology, we do not want to encroach upon the domain of the

physician. The province of the pharmacist, to my mind, is the manufacture of medicines and a knowledge of their properties and constituents, and he should not only know this from the books, but be able to find it out from his own personal experience. I do not think that, for my part, as a chemist, I should wish to make the whole third year practical chemistry.

MR. ECCLES: Professor Simon, in his paper, has presented exactly the point that I have been trying to establish for a number of years past, and have advocated it, in company with members of the college to which the preceding speaker belongs, and that is, to get them to do something in that college in this very direction—to drop out physiology, drop so much materia medica, to throw out about two-thirds of the chemistry that is taught there—and in my efforts I have caused some of them to feel a little ill towards me, simply because I claim that while all that they teach is good, there is something they could teach which is better.

Professor Simon's point is exactly along the line that all the colleges ought to work. We ought to teach the young men to be able to identify drugs, to tell their quality, and to be able to volumetrically estimate them. The time of two years is ridiculously brief for that, and when you add a mite more and try to fill in two or three lectures with the very elements that they will never remember after they leave the college and know nothing about—when you try to fill in four or five lectures on minerals and their constituents—why it is simply time wasted that could be used to better advantage in the study of the drugs of the drug store, and how to deal with them.

Another point that I conceive to be of great weakness in the routine of the colleges with which I am familiar is that of spending too much time in the lecture room, and crowding into the lecture too much material. In one lecture of an hour, you can go over more ground, taking into consideration the other professors and what they teach in their hours, than the average student—in fact, the best student—can possibly master in the time at his disposal until your next lecture comes around for him to hear. He will not be able to go through the laboratory, evidently, to prove what you have said—and by the way, that is a point that I believe ought to be considered by the professor. He should never present anything to a pupil without asking that pupil to go right into the laboratory that very day and demonstrate for himself, when it is fresh in his memory. The professor should show him the experiment while talking, and then ask him to do it himself, and in that way he will become accustomed to the work.

Another point in my teaching experience is this: I have found that students will not set themselves diligently to work until the final term arrives, when they attempt to cram, unless you try and keep them cramming for the whole term; the plan I have adopted to compel them to cram for the whole term is to have a written examination for every week. By marking down what they fail in, you know just where each student stands, and you know what you have to teach; you know just what he does know and what he does not, and until you do know that, you do not know yourself just what you ought to teach them.

I am delighted with Professor Simon's paper, and hope that it will lead to some valuable change in the method of teaching in our pharmaceutical colleges.

MR. WHELPLEY: Like the previous speakers, I do not think I can criticize, or disagree with, this excellent paper of Professor Simon's. I presume that it is the same motive that prompts me to speak that has prompted them, for we cannot too strongly emphasize the sentiments that have been expressed in this paper. I specially agree with the proposition of extending the course of instruction as far as practicable, especially to three years; but the great problem for us to solve is, how to devote those three years? I feel gratified at hearing the plan so nicely expressed by Dr. Eccles, the key-note of which is, to give the students as much practical knowledge as possible, instead of trying to cover as great an

amount of scientific work as possible. I frequently hear students or graduates say, "I once knew all about those things, but never have had any use for them in the last four or five years, and I have entirely forgotten about them." Of course, every teacher must realize that a great deal must be taught that is not what the student would call thoroughly practical; but we must draw the line as closely as possible, giving them, as far as possible, thoroughly practical instruction. Now, a word about physiology and therapeutics. I think the solution of requiring a knowledge of physiology by students in colleges of pharmacy, will come not from teaching it in the college, but from requiring a preliminary education by the student. If your student has a good common-school preliminary education, he will have a sufficient knowledge of physiology and anatomy of the human body to be enabled to understand the meaning of the terms that are used in therapeutics. He will know what is meant by an expectorant, or by a diuretic; he will see the application of these terms and the physiological action, and not learn them merely parrot-like. I never felt, that a druggist, as a druggist, should study therapeutics as it is understood in medicine. By therapeutics in medicine is understood not simply a knowledge of the action of drugs —not, for instance, what an antipyretic is, but a knowledge of the difference between the different antipyretics, and when to give one or another; that leads up to the entire study of medicine, of pathology and of the diseases, so as to discriminate one from another, and then know when to give one antipyretic, for instance, or when another is preferable. The knowledge of the action of drugs that a druggist should possess is simply that which will guard him against the promiscuous use of drugs. A druggist who has some knowledge of the action of drugs is not going to prescribe promiscuously over the counter to any one who comes in, who has a bad cold, or diagnosing his own case, asks for something supposed to be good for his complaint. The general action of the drug, without selecting a particular remedy for a particular disease, I believe should be taught in colleges of pharmacy as far as time will permit.

MR. ELLIOTT: In order that I may not be misunderstood in regard to my last sentence about teaching chemistry, I would say that I perfectly agree with Professor Whelpley, that we ought to teach some physiology. But I think it should be of first importance to give attention to the practical application of pharmacy, the actual manipulation of the drugs that the pharmacist has to use. Dr. Eccles remarked that you can teach a student in an hour something that it would take him a much longer time than he can afford to work out. Yes, you could, if you simply talked to him or showed him an experiment. You won't find five students in a hundred who can go into the laboratory and repeat what you have explained, I don't care how intelligent they are. The best way is to make them do it while you are doing it; in other words, carry out the kindergarten idea. That is the plan that I have followed for the past three or four years, and would strongly recommend every one else to try. It is a little slow at first, but you are fully compensated by the pleasure with which you can go around your laboratory and see men doing things right, not dumping in half a test-tube full of hydrochloric acid when they only need to use three drops, or filling a test-tube full of water when they only want ten drops, but adding chemicals with reason, and getting results every time. It gives them an amount of confidence that is surprising, and it can only be done by working slowly and making every individual student in the class do just what you are doing while you are at work. He sees that you succeed, and he succeeds himself, because he sees the reason for it.

MR. CASPARI: This question seems to be the same that was up last year, only slightly changed. Why it was changed I do not know. I had the pleasure of presenting the question to the Section last year, wherein I asked whether the giving of practical instruction would not be advantageous in the third year's course. That question remained unanswered, and then reappeared altered, so as to read whether it would not be better to introduce physiology and therapeutics. My idea was to give greater encouragement

to practical instruction, and in such a way as to render, if possible, the dispenser of medicines thoroughly independent of the manufacturer. To my mind, and I think to the minds of a great many, the great damage that has been done to the dispensing profession has been through the agency of the large manufacturing establishments. The apothecary has gradually lost his self-respect, and he himself has belittled his profession, because instead of making his pills, fluid extracts and tinctures, as he was wont to do formerly, and for which the practical instruction of colleges would admirably fit him, he now buys the simplest things, even medicated waters, and has become not only less competent in that line, but also become very lazy, and the help given him by the large manufacturing establishments strongly encourages him in this laziness. Some students at our colleges, when we speak to them about the most trifling preparation, will say, "We never make that at our store, but we dilute the fluid extract according to the formula on the label." Whether this is in direct conformity with the requirements of the Pharmacopœia, is a question they never ask. This instruction of the apothecary to my mind is the most important feature of the whole pharmaceutical education—to try to get them back to the days of Procter, Grahame, and those who taught the profession those manipulations.

MR. RUSBY: I had not the pleasure of hearing Professor Simon's paper, but I think from listening to the criticisms upon it that I have a very thorough idea of what the writer is advocating. We all agree, I think, concerning the great importance of making our instruction as practical as possible, but some differences exist among us as to the best means of doing it. Some of us regard one thing as practical, some another. Those of us who teach chemistry are in favor of that branch, while those who teach botany would be rather inclined to think that is more practical than chemistry. Now, I wish to suggest very briefly that it is possible for us to adopt an impractical method of teaching pharmacy. It is possible for us to teach pharmacy in such a way that we take a great deal longer to achieve results than if we taught theory first. Practice is dependent upon certain requisites, and if we devote a reasonable amount of time to giving the student a theoretical idea of the principles upon which his practical work is to be based, we will afterwards teach him a great deal more practical work in the same space of time than we could have done if he had not been grounded in those principles first; so that the longest way around is, within reasonable limits, the shortest way.

MR. ECCLES: Am I to understand Professor Rusby that instead of putting them on the inductive method immediately, he would lay down the theory for them to master mentally, without a knowledge of the facts upon which those theories are founded, or teach them both simultaneously?

MR. RUSBY: I would teach them the two simultaneously, but not begin to build my house by erecting my weather-vane first and building downwards.

MR. HALLBERG: I am in accord with the remarks made by Professor Rusby. I think that in order to get the best results in the education of a young man you should precede with the fundamental facts and principles, and then add to and extend his knowledge by the practical demonstration based upon these fundamental facts and principles. I think it is an error committed sometimes, that the practical instruction precedes the theoretical illustration, and that I do not approve of. With reference to the extension of the course to three years, it is certainly desirable; whether it is practicable at the present time is another question. Regarding the subject of physiology, I approve of the remarks of Mr. Whelpley, that no pharmacist need be versed in the application of drugs and medicines except to understand that they should not be abused, not for their use, but to prevent their abuse. However, there are certain subjects connected with

physiology which the pharmacist, as an educated man, related to medicine, ought to know; and one of them, for example, is the process of digestion, in order that he may thoroughly understand the object of such medicinal agents as the digestive ferments, perhaps pancreatin, etc. This he may know in a general way at least, and also know, in a general way, sufficient of anatomy to enable him to understand the rationale of such medications as subcutaneous injections, inunction, the use of oleates, and preparations of that kind. Further than that I do not think that a knowledge of physiology is desirable.

MR. ECCLES: There seems to be a confusion in the mind of the last speaker, in his own words, or else a very great confusion in my mind as to what those words mean. He speaks of facts, theory and practice. He would give his facts and theory first and the practical experience afterwards. I cannot see how a student can have facts, except as a parrot would have them, unless those facts come from the practical experience, and not lead to the practical experience. It is nature that teaches facts, not books. Am I to understand Mr. Hallberg that the book must teach the fact, and after the book has taught the fact and the theory, that the student then will go and learn the same thing from nature?

MR. HALLBERG: Yes, sir; and if the doctor will allow me to make a remark, I will simply ask him, is it impossible for him to know that the world is round unless he traverses it first?

MR. ECCLES: It is impossible for him to know the world is round unless he has had experience with a round thing in nature. He must know the facts upon which the conclusion is based. It is not necessary for him to know that exact fact, but he must have some fact related to it in nature. We go from what we know to what we do not know in all education; he must see what a globe is—must know that in watching a ship going out to sea the hull will disappear first and the masts last, and that that is a condition belonging to the globe. Go inland, and try to teach a boy who has been raised in the backwoods what the shape of the world is, and you will find it a much harder task than to teach one who has been brought up by the sea-shore, and has witnessed the facts tending to prove it.

MR, HALLBERG: If the doctor will allow me, I will state that his position is exactly the same as mine. This very condition as related to the education of our pharmacists, I am in favor of. We do not take a young man who has been in the valley, entirely ignorant of anything outside of that valley, but a young man that has been two or three years in a pharmacy, and has seen these facts, and knows the difference between a liquid and a solid. There he gets the principles and the theory; and then after he has had both of these, by practical demonstration and elucidation and experience, he finally attains such a safe position in the knowledge of the subject, that he becomes an educated man.

MR. RUSBY: That would be all right if the pharmacists were taught much, but we have learned this morning that they buy even medicated waters. They are not making them, and do not have the experience they need, in the pharmacy. That is the kind of student we want, a student who has been raised in the valley all his life, to my mind. Take him into the laboratory and show him the facts.

MR. ECCLES: Mr. Hallberg also referred to another matter in regard to physiology. He misses the point of Professor Simon's paper, who, if I remember, does not object to the teaching of physiology and of materia medica, but what he is advocating is economy of the student's time, and the most important subjects to be taught in the brief time

allotted to him. If there are subjects of more importance than physiology, teach them, and leave out physiology; if the subjects taught are of less importance than physiology, teach physiology, and leave them out. The question is, the importance of the subject.

In the absence of the author, the Acting Secretary read the following paper:

## TO WHAT EXTENT SHOULD PHARMACY BE TAUGHT MEDICAL STUDENTS? TO WHAT EXTENT SHOULD THE ACTION OF MEDICINES BE TAUGHT PHARMACY STUDENTS?

BY L. E. SAYRE, UNIVERSITY OF KANSAS.

An answer to the question "To what extent should pharmacy be taught to medical students?" can, at best, be but relative and provisional. From a theoretical standpoint a physician should be as well acquainted with the professional side of the pharmacist's work as is the pharmacist himself. Practically, this is found not to be expedient. That the medical student should have a thorough theoretical knowledge is, however, beyond dispute. A soldier, though not expected to be a gunsmith or mechanic, must be acquainted with the use and construction of his weapons. So a doctor, though unable, by virtue of the tendency of the present day toward specialization, to gain a complete knowledge of the practical and manipulative side of the pharmacist's business, must know the theoretical part of the same. A century or more ago, when the doctor was dentist, surgeon, physician, apothecary, all in one, a knowledge of the practical side of pharmacy was, of course essential; but to-day the doctor's time and energy, especially in the cities, cannot be spread over such a territory. He has all he can do to keep up with the practice of that department alone to which he especially devotes himself. Sometimes that department is circumscribed—devoted to the treatment of the eye alone, it may be, sometimes to the ear, or to the throat. The doctors who attempt to do *everything* do nothing well, fall very low in the scale of medical reputation, and very little is expected of them. To the prospective physicians of this class, this paper will have very little to say.

Two professions as intimately relative as those of the doctor and pharmacist, must needs have much that is common and reciprocal, yet there should be a line of division between the domains of each. Where to place this, however, is a matter depending much upon the field in which the student expects to labor, and upon the success he wishes to achieve. Assuming the school to be one which prepares its students for a general practice, the work in pharmacy should be such that the following conditions might be fulfilled: In order to prescribe intelligently preparations which are suited to the various diseases the physician is called upon to treat, an intimate acquaintance with the mode of preparation and physical properties of the various U. S. P. preparations should be taught. That the

behavior of drugs in various combinations may be understood and appreciated, a thorough knowledge of the chemical constitution of the many remedial agents is necessary. To render prescribing easy and efficient, the constitution and strength of the pharmaceutical preparations should be understood. A thorough education would also require a knowledge of the sources of the articles of the materia medica, the adulterations commonly found in them, and in fact anything that would prove a help in selection of remedial agents that would be the most efficient in the cure of diseases.

The technical part of the pharmaceutical profession especially belongs to the pharmacist, and his peculiar position also requires business sagacity, manipulative ability; but a practical knowledge of the field of the physician he is not required to have. The doctor needs only to know *what* must be compounded, while the pharmacist must also know *how* it is to be compounded.

TO WHAT EXTENT SHOULD THE ACTION OF MEDICINES BE TAUGHT TO PHARMACY STUDENTS?

The situation of a pharmacist with relation to his medicines is a peculiar one. He may be likened to a general with his men intrenched in a fort. The knowledge of what is transpiring on the outside is left to other officers. He knows his followers, their strength, their behavior, and how to direct them in the maneuvers of war, and yet is not watching the movements of the enemy. So the pharmacist must have his array of drugs whose action and behavior he knows, yet is dependent on the physician for directions and orders concerning their administration.

The instruction to the pharmacy student in the action of medicines should be such that he might know for what purpose a drug is used, how it is best administered to secure its action, and its therapeutic application. He should be acquainted with its dose, its antidote if poison, and its therapeutical antagonists. Situated as he is between the physician and the public, the knowledge of the pharmacist should be such that in case of mistake by the doctor he could maintain his reputation by correcting or calling the attention of the physician to them. His theoretical knowledge should be almost as great as the M. D.'s, but he need not be acquainted with the practical application of the medicines, nor be able to tell from his diagnosis of a case what medicines are necessary. Knowing the disease and its condition, however, he should be able to tell what would be desirable for its treatment. The pharmacist may advantageously know what remedy is applicable in certain classes of disease, but the physician must know definitely by practice the details of treatment in the use of the remedy.

MR. ECCLES: The author claims that the pharmacist should know the therapeutic incompatibilities of the remedy. Now, while knowledge like that of physiology might no doubt become beneficial in one direction, I think it would be injurious in another; for I do not think any physician would tolerate a pharmacist making a suggestion, let alone improving upon the prescription in physiological ability.

MR. CASPARI: If I understood the paper correctly, the statement is made that the apothecary should be familiar with the remedies to be used in certain diseases. I think that this is entirely out of the province of the apothecary. He should be familiar with the effect of so many doses, etc., but when it comes to deciding the particular remedies needed in a disease, that is not his province. The suggestion made by Professor Sayre would be apt to lead to counter prescribing.

The following paper was then read:

## NOTES ON PHARMACEUTICAL EDUCATION.

BY PROF. DR. EDWARD KREMERS, MADISON.

### *The Study of Materia Medica.*

The term *materia medica* was originally employed to designate *the material used for medicinal purposes.* The German pharmacies still have their "Materialkammer," the storage room of the *medical material.* Later the term was made to cover the sum total of knowledge pertaining to medicinal substances. In this sense it is said to have been used by *Pedanios Dioscorides*, the oldest pharmacologist of whom we have any knowledge, and who lived at the time of the emperor *Nero*, on the title page of his book. Up to the present day materia medica, in the larger sense of the word, is the science of remedies, the "*Arzneimittellehre*" of the Germans, *pharmacology*.

The days when physician and pharmacist were one are to us ancient history. At present the medical specialist is to a large extent supplanting the general physician. A subdivision of the science is a natural consequence where a division of labor has preceded. Materia medica, or pharmacology, has therefore become the mother of a number of sciences. Of these—

1. *Pharmacognosy*, the science of drugs ("*Drogenkunde*") has become an independent science. Besides this we have as subdivisions of materia medica the following sciences:

2. *Pharmaco-chemistry*, of which *pharmaceutical chemistry* is supposed to cover the subject of preparation and reactions of medicinal chemicals (a scope altogether too limited), and of which *pharmacological chemistry* aims to investigate the relation of remedies to the chemical constituents of the organism, and to trace the changes which these remedial agents undergo in the organism, as well as those which they bring about. Pharmacological chemistry also furnishes to a large degree the material for

3. *Pharmaco-dynamics*, which treats of the effects produced by remedies. ("*Arzneimitteiwirkungslehre.*")

4. *Pharmaco-therapeutics*, or simply *therapeutics*, is the empirical knowledge, the large part of which is the result of observations made at the bed-side.

5. *Pharmaco-morphics*, or *pharmaco-poetics*, the "*Arzneiverordnungslehre*" of the Germans.

From this classification and brief description, it becomes apparent that materia medica might well be classified professionally into *pharmaceutical* and into *medical* materia medica. Here and there these branches would join upon the same ground as do e. g. pharmaceutical and pharmacological chemistry. Both, however, would have their definite aims, and would supplement each other, as pharmacist and physician do, or at least ought to do.

It is with pharmaceutical materia medica that we wish to concern ourselves. Pharmaceutical materia medica, to slightly modify our old definition, is the sum total of knowledge which the pharmaceutical student is expected to acquire. The two applied sciences which are made to cover the ground at present, are pharmacy and materia medica, both terms being used in a limited sense. The latter includes crude organic drugs, the former inorganic and artificial organic drugs, galenical preparations, the operations of practical pharmacy, etc.

It will be seen at once that this division between pharmacy and materia medica is altogether arbitrary and artificial. Furthermore, the line of distinction is by no means always the same. It will, therefore, be of interest to see e. g. what is taught as materia medica.

According to *Hallberg's* Pharmacal Calendar of the thirty-five Schools of Pharmacy in the United States:

11 have combined chairs of Botany and Materia Medica.
7 have separate chairs for Materia Medica.
3 have combined chairs of Pharmacy and Materia Medica.
2 of Materia Medica and Therapeutics.
2 of Materia Medica and Toxicology.
1 of * Materia Medica and Pharmacognosy.
1 has separate chairs for * Materia Medica and Pharmacognosy.
1 has a combined chair of Botany and Pharmacognosy.
1 of Physiology, Botany, Pharmacology and † Materia Medica.

Of the teachers, 10 have the degree of M. D.; 2 of M. D., Ph.G.; 1 of M. D., Ph.C.; 1 of M. D., Pharm. D.; 1 of M. D., Ph.D.; 1 of M. D., M. A., Ph.D.; 1 of M. D., A. M., Ph.G.; 1 of M. D., A. M.—18.

6 of Ph.G.; 3 of Ph.C.; 1 of Ph.M., Pharm. D.; 2 of Ph.G., Ph.D.; 1 signs himself F. R. M. S.; 1 M. P. S.—16.

In whatever light these data may be considered, they clearly show that medical materia medica receives an undue share of attention in the pharmaceutical schools. It is certainly well for pharmaceutical students to study therapeutics and other medical sciences, but most courses of pharmacy are too short to lay even a good foundation in the strictly pharmaceutical sciences. If courses in pharmacy are to be improved, such im-

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* Evidently medical Materia Medica.

† Evidently pharmaceutical Materia Medica.

provement ought to be sought in depth rather than in breadth. The fundamental sciences, physics, chemistry and biology ought to be given more attention. Above all, it must not be forgotten that physician and pharmacist are to supplement each other, not only in the practice of their professions, but also in their educational qualifications.

Materia medica, in the broadest sense of the term, is, as has already been stated, the sum total of knowledge of medicinal substances, of the *medical material.* It is not a general, but an applied science, based chiefly on physics, chemistry and biology. As it long ago has become necessary to make a division of professional labor between medicine and pharmacy, accompanied by a corresponding division of the science of materia medica, so the rapid growth of the general sciences in recent decades, has necessitated a subdivision of both medical and pharmaceutical materia medica. Such divisions may not always have been rational. Whether or not, there can, however, be little doubt that divisions made half a century and a century ago, may be antiquated and unscientific at present. If the botanist is compelled to specialize in his particular science of botany, and the chemist still more in his scientific realm, the pharmaceutical instructor certainly cannot teach botany, chemistry and even more. Yet there certainly is a botanical side to pharmaceutical materia medica, and there is a distinctly chemical side to pharmaceutical materia medica. The very fact that pharmacists are mostly ranked as second and third class scientists, if tolerated as such at all, shows that they have not been able to keep abreast with the times.

Aside from medical materia medica, there are, as it were, two schools among teachers of pharmaceutical materia medica.

The one might be designated the botanical school, the other, the natural historic school. Botanists who teach materia medica naturally are representatives of the first-named school. Their classification of drugs is based upon a morphological standard. Roots, rhizomes, barks, leaves, etc., are considered as classes, and are studied morphologically, and possibly anatomically. This certainly is very well as far as it goes, especially if the study is conducted in the laboratory. To compel students to commit to memory descriptions of drugs from text-books or from lecture notes, is a gross pedagogical mistake. It means cramming the memory with facts, and facts only, which are possibly retained up to the examination, but little longer. Even where this study is chiefly a laboratory study, it is mostly not preceded by a sufficiently thorough study of general botany.

Botanical materia medica, or pharmacognostical botany is of great value to the pharmacist, inasmuch as it enables him to identify drugs, and to detect falsifications and adulterations. But pharmacognostical botany is only a part of pharmaceutical materia medica. Neither the physician who prescribes, nor the pharmacist who dispenses, is excusable if ignorant on the subject of modern chemistry. That the medicinal value of most drugs

is dependent on their chemical constituents, and that the therapeutic effect of chemical compounds is dependent on their chemical constitution, can no longer be doubted. If the chemist finds it difficult to master his science, the botanist certainly is to be pardoned if he finds it utterly impossible. However, the botanist is not to be pardoned if he tries to teach chemistry. How meagre text-books on materia medica, written by botanists, are as to chemical information, and how unscientifically such information is arranged, goes almost without saying.

As to the natural historic school, its followers make the families of the vegetable kingdom the basis of classification. However natural this classification may appear at first sight, it certainly does not give satisfaction in the study of pharmaceutical materia medica. The various drugs are usually considered in the form of monographs, origin, history, description, constituents, etc., constituting the various paragraphs or chapters.

Botanically considered, the study of pharmaceutical materia medica consists chiefly, as we have already seen, of morphology and anatomy of drugs; but no botanical morphologist or anatomist will teach the morphology or anatomy of one leaf, bark or root in one hour, and of another root, bark or leaf in another. The followers of this school, sometimes more chemist than botanist, devote as a rule more attention to the chemistry of their subject than do the followers of the botanical school, and justly so. Here and there the classification according to families affords an advantage over the morphological classification. Chemically, however, neither is justified. Strange to say, not one has ever treated the subject of pharmaceutical materia medica one-sided chemically. However, to emphasize the chemical side at the expense of the botanical side would be equally wrong as the botanical monopoly. A well known German teacher of pharmacognosy recently has even gone so far as to see in the most detailed anatomical study of drugs the future salvation of the pharmacist. Pharmaceutical materia medica should be neither one-sided botanically or chemically. But since it is impossible for the modern college botanist to teach college chemistry or vice versa, the necessity arises to have at least two courses of pharmaceutical materia medica, viz., pharmacognostical botany and pharmacognostical chemistry. These two courses may well be supplemented by a natural historic course.

*Pharmacognostical Botany* should be preceded not only by an elementary course in general botany, but by a thorough course in general biology. The vegetable forms of life cannot be thoroughly comprehended without a knowledge of the animal forms of life. Since it is generally recognized that the natural sciences cannot be studied from books alone, the proper preliminary for applied botany is a thorough laboratory course in biology, supplemented by lectures and recitations. Since drugs are obtained chiefly from seed plants, a course in morphology and anatomy of these plants also becomes necessary. The course in morphology should consist in labora-

tory and field studies, supplemented by lectures and recitations. The field work should comprise the collection of an herbarium (preparation, description and mounting of specimens). The course in anatomy should consist of laboratory study of general botany, gross and minute, with drugs as specimens. It is not at all necessary that each and every drug be studied in detail. The study of typical forms is sufficient. One of the most valuable results of study in general is independence of thought and of action. In case of need the real student will know how to help himself. The student who has successfully, as it were, completed a course of analytical chemistry, but is afraid to apply his knowledge to the analysis of water, or an iron ore, does not deserve the name of a chemist. The botanist who dares not examine a specimen of sarsaparilla because in the laboratory he has not studied each and every commercial variety, ought to return to school to learn how to study. As the mineralogical student forms a collection of minerals and adds to each specimen a label with name, brief description of crystallographic forms, and of chemical composition, etc., so the pharmaceutical student should at college form the nucleus of a collection of drugs. Each specimen should be labeled and provided with a brief description, with permanent sections and with drawings. These specimens could at any time be consulted as standards, and the collection could be completed in the course of time. At least with some, this work would maintain a lasting interest in one branch of scientific pharmacy. Such a collection would be an inspiration to apprentices and of permanent value and usefulness. It could even be made a matter of legitimate advertisement. How differently would the public be impressed by a series of neatly mounted drugs, correctly labeled and described, than by the show of the average drug-store window. A single sponge with a fragment mounted under the microscope, accompanied by a drawing and brief description, would be of much greater credit to the proprietor than hundreds of finely bleached sponges in an expensive case or suspended from strings.

A cake of opium with specimens of several of the alkaloids and their salts, a collection of the various opium preparations, an opium pipe with prepared opium, illustrations showing how opium is collected, how it is smoked, etc., a few statistics on the commerce of opium, etc., would more than pay for the small expense incurred.

Specimens of cinchona barks neatly mounted and labeled, longitudinal and transverse sections under the microscope, accompanied by drawings and descriptions, the various cinchona alkaloids and pharmaceutical preparations, the total alkaloids from an assay, etc., illustrations of collection, of original packages and transportation, would be of interest to every intelligent observer.

*Pharmaceutical and Pharmacognostical Chemistry.*—Why inorganic materia medica, with the synthetic organic remedies, should be considered in pharmaceutical chemistry rather than as a unit with pharmacognostical

chemistry, is a fact that certainly cannot be explained satisfactorily from a scientific or from an educational standpoint. The nature of most chemical compounds occurring in plants and animals is of a degree of complexity which does not render their study easy. To demonstrate to a class of students who are not supposed to be advanced chemists, an alkaloid in one hour, a glycoside in the next, and a terpene or camphor in the third, or all three in the same hour, is certainly unwise. The alkaloids and ptomaines, the sugars and glycosides, the terpenes and camphors, must be studied together with allied classes of chemical compounds, and as groups by themselves. What is true of these three important classes is true of all classes of chemical compounds. Pharmaceutical and pharmacognostical chemistry should be taught as a unit, based upon a review of so-called general chemistry. Chemistry is chemistry, whether general or applied. The dividing line between general and applied chemistry is an imaginary boundary that exists in some men's minds, but not in nature. If it is a fallacy to make chemistry a purely abstract science, it is also a folly to study chemical facts without giving due consideration to generalizations. Chemistry in many of its departments has come so near to being an exact science that it can to a large extent be taught deductively, at least so far as it is taught by lectures. To place within the grasp of a single line of thought the development of hosts of chemical compounds, to study the evolution of series, to reason by analogies, to study not only the properties of the elements as functions of their atomic weights, but also the properties of compounds as functions of their constitution, raises chemistry even in its applied departments far above the level of a mere descriptive science. The study of chemical compounds, in the form of monographs may have had its advantage in the past, and although chemistry still has large and complex artful groups, it also has the beautifully wrought-out periodic system as a basis to work upon. The student who has learned ten or twenty isolated facts about each of hundreds of different compounds, has acquired so much knowledge, but his mental training has been artful and bungling. Teach a student how to think, and with the use of books his logical mind is worth more than mere encyclopædic training. The student who has crammed his brain with facts, and after having passed his examination with 95 or more, goes home with the impression that he knows it all, certainly is to be pitied. He has not been educated, but as the Germans say, "*verzogen.*" Training the memory is not education. The darkey porter who receives and returns hats at the entrance of a large dining hall of a hotel may have a better memory, though he dare not reach the cap intellectually to the scholar who searches for his hat while he has it on his head. The time of the good old antiquarian who seeks the precious pearl simply because it is rare, or odd, or unique, or old, is happily giving way to the scientific ethnographer, who collects because a single tablet may unlock the realm of Sanscrit literature, or because the painting of a terra cotta vase, consid-

ered inartistic, may reveal something new of antique social life. The person who is endowed with a good memory should be thankful, but facts must be considered as historical reminiscences in natural sciences as well as in the study of history. A man with a thinking mind and with a capacity to use his tools, be they instruments or books, is the modern scholar. Wherever chemistry is to be taught, be it pharmaceutical or pharmacognostical, let it be scientific chemistry, for there is no other.

Pharmaceutical chemistry in the broadest sense of the term should be preceded by a thorough course in general chemistry, descriptive and analytic, inorganic and organic. Applied chemistry, in this case applied with reference to pharmacy, should be based on a review of general chemistry. In the study of series and classes, special attention should be given to substances of pharmaceutical interest. However, these substances should not be studied isolated from the others, but as members of the series to which they belong. Their properties will then appear as functions of their constitution. The study of such substances will then no longer be a matter of memory pure and simple, but largely of reasoning. If all pharmaceutical chemistry, that of pharmacognosy and that of pharmacy, is considered as a unit, natural compounds will be brought together with allied synthetic remedies. In connection with the latter, the peculiar physiological action of at least some classes of remedies can be traced to particular groups, and thus the value of medicinal agents can at times be shown to be dependent on chemical constitution of the same.

Such illustrations would be of no little importance to the medical student as well. The application of synthetic methods to the study of physiology and therapy will probably aid more than any one thing to make medicine an exact science. However, it seems almost a waste of time and words to make a plea for the unity of pharmaceutical chemistry, and for a uniformity of treatment of chemical matters of pharmaceutical interest. There can scarcely be any doubt as to its rationality and expediency. (The fact that the chemical side of pharmacognosy has not been sufficiently emphasized, heretofore, probably, is the cause that pharmaceutical teachers at large were not aware that besides the teacher of chemistry, two instructors were teaching chemistry at the same school, the one together with practical pharmacy (pharmacy), the other with botany (materia medica or pharmacognosy).

*A Natural Historic Course of Materia Medica.*—It is apparent that the ground covered by pharmaceutical materia medica, as best taught at present, is not fully included in the two studies just considered. Pharmacognostical botany certainly can be taught best from a botanical standpoint, and pharmacognostical chemistry will be better comprehended when taught as a unit with pharmaceutical chemistry and based on a review of general chemistry. Petrography is taught after courses in mineralogy and geology have been completed. Pharmacography can be studied with

greatest advantage after general and pharmacognostical botany and general and pharmaceutical chemistry have been successfully mastered. The origin of drugs, the habitat of the plants from which they are obtained, the modes of collection and transportation, the history of the drug, etc., cannot be considered with satisfaction in the study of morphology and anatomy or of chemistry. Indeed, the student might do without and become a good practical pharmacist; yet he would be the loser. From the utilitarian standpoint such information is of little or no use; from the humanistic standpoint, however, it is very beneficial. In our utilitarian and materialistic age, too little attention is given to history even in the academic courses of our colleges and universities. The professional student should at least have a fair knowledge of the history of his profession. If philosophy makes the natural sciences interesting, history lends them a peculiar charm. Both, I dare say, are equally important in the symmetric development of a scholar. To touch upon all the points mentioned above, or upon even more, the method of the natural historic school might be followed. Special courses might, however, be given in plant geography, on the history of materia medica, etc., and should be supplemented by reading. Considerable variety is possible, and the greatest liberty ought to be taken by the individual. A course based on the principle of classification of the natural historic school would certainly be of great profit, particularly if combined with a course on economical botany.

In conclusion, pharmaceutical materia medica, too comprehensive to be taught as a unit, should not be divided into pharmacy and pharmacognosy, a division no longer in harmony with the present status of the natural sciences, but according to more scientific and pedagogical principles. Since materia medica is an applied science based upon physics, biology and chemistry, these studies should precede the pharmaceutical studies, and a division of the typically pharmaceutical studies should be effected with reference to these three fundamental studies. As a practical example, the course in pharmacy at the University of Wisconsin as mapped out for the coming year may be mentioned. I want it to be understood that I do not consider the course mentioned as an ideal course. It is far from being such. It is but a compromise with existing circumstances. I shall not attempt at present to explain what I consider a proper course in pharmacy. The foundation for such a course is almost utterly wanting, and I have no desire to build air-castles. One fact, however, is undeniable. The needs of pharmacy lie in a more thorough and in a broader education. Even in Germany, where the pharmaceutical standard is highest, educators and students as well as pharmacists have recognized the fact that the standard is not as high as it ought to be. The salvation of the pharmacist does not lie in making all microscopists or all analytical chemists. It will be achieved by raising all to the highest educational

standard prevalent in the country, and by allowing the individual to find for himself the special field for which he is best fitted.

MR. WHELPLEY: I have been interested in following this paper, and if I understand it right, it is virtually divided into two parts. The first outlines pharmacognosy as taught in the colleges of pharmacy to-day in the United States. The second is a plan on which it should be taught, according to the views of the anthor. I have often wondered what was being taught in the various colleges of pharmacy in the United States, and thought how valuable it would be if each teacher could understand just what the other teachers in the same branches are doing. But I fear that the deductions in this case are drawn from a source of information that cannot be correct. The author seems to have drawn his deductions from the titles held by the teachers in the various colleges. For instance, there are eighteen doctors, teachers of pharmacognosy, hence these are teaching what the author terms "medical pharmacognosy." We have just received a report from our secretary, which gives us statistics without conclusions. I feel as if we now have conclusions without statistics. I would say, however, that this brings to my mind a plan which we may be able to follow at some future time—that of setting apart a certain time in this Section, during which each teacher of a certain branch may explain to the Section his methods of teaching that special branch. I believe that it would be not only interesting but instructive, and enable us to see not only how we stand with the students of our own college, but the relation of our own to the teaching in other institutions. There is only one way in which an individual can learn what is going on in the other colleges of pharmacy, and that is by taking a course in each one. It would be possible if the various teachers, for instance those of pharmacognosy, who had issued some works such as we have had from Professor Maisch, would give us an outline, at least, of pharmacognosy as taught in the various colleges; but I believe that with the exception of Professor Maisch's work, we have no clue to the systems followed in the other institutions. As for the second part of the paper, I would simply say that I fear that if it were carried out in all the colleges of pharmacy there would be little room for other branches than that of pharmacognosy. However, it is certainly very interesting to see what can be done in the way of outlining any one branch in a college of pharmacy, and I feel very much as Professor Rusby said not long ago, that the importance of any branch depends very much on who is teaching it. The medical students used to say when I was at the medical college, "Oh, this is the Professor of Physiology, and now physiology is the most important branch of medicine." Pretty soon in comes the professor of materia medica, from whom we learn that the medical student cannot become a doctor unless he pays special attention to materia medica; and then in comes the professor on skin diseases, and we find out that unless we know all about skin diseases we never will be doctors, although we may know everything else.

MR. KREMERS: Will you allow me to make a remark? I was afraid I might be misunderstood in giving statistics, which were not supposed to be statistics at all. The deduction I draw from them is not anything very definite, and to quote my words, without reference to the paper, "In whatever light these facts may be considered, they clearly show that medical materia medica receives an undue share of attention in pharmaceutical colleges." I claim that as a person who has a botanical education cannot teach chemistry, or a man educated in chemistry cannot teach botany, insomuch will I claim that the man who has a medical education is not qualified to teach pharmaceutical materia medica, etc. I will not say that there are no exceptions, but he is not qualified, in the full sense of the word. There may be many men here who have taken a medical degree, as I have shown, simply as a continuation of their studies, and have a thorough general scientific foundation, and some with a pharmaceutical education besides may be qualified. I have endeavored not to be personal in any respect, not to draw conclusions from particular

people or titles. I have only shown that there are so many men with a medical education teaching pharmaceutical materia medica, and I think, therefore, that there is something wrong in pharmaceutical education. Furthermore, I wish to state that by no means is the entire course, as I have outlined it, a course of pharmacognosy; but if you have followed what I have said, this only occupies one side, as it were. The first year, generally, it is not taught, and the second year, as I have advocated, it falls into chemical and organic studies, one half of each. So there is only one-sixth of what is ordinarily comprehended under pharmacognosy or materia medica in the course.

MR. EBERT: From practical experience, I can bear out what the gentleman has said. I believe that I have had as much experience in different colleges of pharmacy as many of the gentlemen here, and I know that whenever an M. D. was chosen professor, it happened usually that he had never been a pharmacist, though there have been exceptions. They have taught materia medica, medical materia medica, and to such an extent that when the students graduated they knew something about the treatment of disease with the instruction they had received, but knew very little about the history of the drugs. I also know that men, who have been professional botanists, have given the students such botanical instruction that they were botanists when they graduated, but knew little about the history of drugs or the drugs themselves. We have found that to be one of the necessities in the evolution of pharmacy in this country, for we have had no trained teachers in times past, and it is only at this period that it is possible to make such a selection of men who have also a knowledge of pharmacy and of these different applied sciences that enter into the curriculum of a college of pharmacy. I think the gentleman who has read this paper has given us the true gist of the matter, for, invariably, when I saw the name of an M. D. in connection with a professor of materia medica, I would feel pretty well satisfied that in that college of pharmacy a great deal would be heard about materia medica related to medicine and the practice of medicine, instead of that applying to pharmacy.

MR. RUSBY: I think we must all be impressed with the fact that we have listened to a very learned paper, and one which will rank among the historical brochures of this Association. At the same time, while we admit this fact, there will undoubtedly be many things found in the paper concerning which the members of the Association will take issue. For my part, I certainly disagree with the statement that because a man knows chemistry he is not fit to teach botany, or because he knows medicine he is not fit to teach pharmacognosy. We have read in the good book that a little knowledge is dangerous to a man, but I have never learned that a great deal is dangerous. It is not necessary that a man should fail in having a knowledge of one science because he has a knowledge of another, and certainly I am able to present evidence to disprove the statement that because a man is an M. D. he is not competent to teach pharmaceutical materia medica. If you will allow a personal allusion, as I happen to be one of these unfortunate M. D.'s, I have elaborated a course of instruction in pharmaceutical materia medica and pharmacognosy, and simply for my own satisfaction have written out also a series of lectures such as I would deliver to medical students. I wished to see how it would look, worked out on that line, and having done so, and compared the two courses of lectures, I was surprised myself to find there was almost nothing in one that there was in the other. My course of twenty-five lectures on materia medica for pharmaceutical students contains almost nothing that those for the medical students contain. The system followed was different, the illustrations different, and the points upon which stress was laid were different, and no one, I think, who examined the two courses would know that they originated from the same man. Now, it is all very well to speak of general principles, but it is quite another thing to lay down an iron-clad rule; and I do deny strenuously that because a man is an M. D. he is not competent to consider a subject

from a pharmaceutical standpoint, and to teach it from that standpoint. I would make the same reference to the one who is a graduate in pharmacy and not an M. D. If he has studied pharmacy properly he is in a position to pursue original courses of study and review without having taken the degree of M. D. at a college beforehand, and, if he is a good teacher, to impart a very correct idea from a medical standpoint.

MR. ECCLES: There are four M.D.'s in sight at the present moment, including myself, all of whom are teachers. Two at least, Professor Whelpley and myself, were pharmacists before we were medical men, and had experience as druggists before we had experience as practitioners. The remarks of Mr. Ebert, therefore, would not apply to us. But I was wondering what proportion of medical men who are teachers in our colleges of pharmacy have had experience in the drug store, since there are three, or possibly four, present, who have had such experience. So you see that a large proportion of them had that very experience you are now advocating, and therefore belie the conclusions of the paper just read, because the bias of our minds is right in the direction of pharmacy, and not in the direction of medicine. The earliest impressions are always the strongest, and the earliest bias is always the one that carries the greatest weight. Hence, I really do not believe that the conclusions of the author from the premises he has laid down are correct. Another point in the paper I can scarcely agree with. I might, however, give the author the same credit as Dr. Rusby, in declaring it to be an able and admirable paper, and such criticisms as I make are only on little points, and not on the main issue, because I believe it is a learned and able paper. I think the author gave scant justice to pharmacists at large when he said that in the ranks of science the pharmacist ranks second, third, or fourth, for in the ranks of any profession or party there are all degrees, and considering the number of pharmacists in the United States, compared with the number of medical men, and then comparing them with other professions, I think that this statement will also be found to be incorrect. That there are more A No. 1 men in proportion to their numbers, men standing high in scientific reputation, in the ranks of pharmacy than in the ranks of any other profession, cannot be denied. To-day we have as president of the American Association for the Advancement of Science, a teacher in a pharmaceutical school. We have here seated with us, to-day, a number of men who are recognized as able men in their particular departments. Where, in an assemblage of any profession, with so few people present, would you find men with international reputations in their various departments? I do not think that the conclusion reached by the writer of the paper is at all correct. He stated that the utilitarian is opposed to the historic method. It is simply a question as to which is the line of least resistance to pursue in education, and by which process can the most be achieved in the brevity of time that is allotted. It is simply the fable of Æsop of the boy and the nuts. The boy putting his hand into the narrow necked jar to pull out the nuts, fills his hand too full, and gets none at all. If he lets go half the nuts and then withdraws his hand, and keeps withdrawing in that way, he will succeed in getting an ample share. Now, the efforts of the college that undertakes to conduct a course in materia medica, as it is mapped out by the paper offered today, must result in the student's hand being fastened in the neck of the jar, and in trying to do too much he will do nothing. That is the trouble.

MR. KREMERS: I am one of the young men of the profession and a man of little experience, and am, therefore, very glad to hear any suggestions. It was largely for this that I wrote this paper, to get the views of my colleagues, and I am very thankful that these remarks have been made. I am very sorry, however, that the discussion has taken a personal turn. I did not anticipate anything of the kind. Some of the men mentioned here I need not assure you I have the highest appreciation for. I was careful not to make any definite statements. I only came to that one conclusion, that men who have largely a medical education are, as a rule, not qualified to teach pharmaceutical

materia medica. Furthermore, I need not demonstrate at all, whether the college bot anist can teach chemistry to-day. The time of iron-clad rules is gone. The botanist will recognize that, and will admit that the botanist who finds it necessary to do any advanced work in his science, will have to specialize. We have men who devote their lifetime, we might say, to botanical classification, others that devote their time to physiology or other particular realms of botanical science. They have a general survey of the field, but, in order to do the best work, they have to specialize. It is the peculiarity of our age that men must specialize to do good work. The same is true of chemistry, and I need not tell any of the chemists here that although it is necessary for a teacher of chemistry to have a knowledge of the general field of chemistry, yet, in order to do the best work possible, he must specialize nowadays to an extreme extent. It may be a condition that is rather deplorable, but it is, nevertheless, a fact that the best work is now being done by specialists. Any one who attempts to read the five thousand pages of the German Chemical Society's annual volume will see that the chemists who do the best work are specialists. These men have a general knowledge of chemistry, and they teach it, and are able to do so, but none of these men would ever attempt to teach botany as well as chemistry.

MR. HALLBERG: I do not think that any remarks made here with reference to the statements of Dr. Kremers are of a character that should cause him to feel at all uncomfortable. His was a general statement, and probably exceptions were taken to it which were scarcely warranted. I would like to ask Professor Kremers if he had taken into consideration the study of drugs, in the branch of pharmacy, from a pharmaceutical standpoint and with reference to their constituents, as formulated originally, I believe, by Professor Procter. That, I believe, is carried on, with more or less elaboration or modification, in nearly every college, and it seems to me that in conjunction with the study of pharmacognosy proper, it gives the student all the information possible that is necessary to qualify him to practice pharmacy. It is not proposed to educate scientists in the colleges, but to qualify young men, to the very best of the ability of the colleges and the status of the profession, to practice pharmacy. Have you taken into consideration this syllabus by Professor Procter?

MR. KREMERS: I wish to illustrate this method of teaching by an example, as I have done in my paper, if I am not mistaken. You take either method, the natural-historic method or the botanical method, and take the drugs and mention their constituents. Now, what do you know about their constituents? The botanical method is very well botanically, and the natural historic method has its advantages; but it cannot be denied that the value of the drug and its physiological action depend upon its chemical constituents, and, therefore, we ought to have some knowledge of the constituents. What knowledge has the student of alkaloids? It is a very difficult group to treat at all. Why, then, treat one alkaloid to-day, another the next week, and another the third week. Treat them the way a chemist would treat them.

MR. HALLBERG: That is exactly what is done. I will appeal to any teacher here as to whether that is not so. I believe every college does treat these drugs in the branch of pharmacy, according to their constituents. Are you familiar with the Syllabus of Professor Procter?

MR. KREMERS: No, sir. I am familiar with a number of text-books on pharmacognosy, but I am not familiar with that one. The only text-book in which these substances are treated chemically is Schmidt's.

MR. HALLBERG: I am sorry that Mr. Kremers is not familiar with pharmacy as taught in the United States. There are no colleges of pharmacy in Germany. They have them

in France and Great Britain and Sweden, but not in Germany. I believe that in 1840, when Professor Procter was chosen to fill the first chair of pharmacy in the United States, there were some misgivings among the members of the Philadelphia College of Pharmacy that the branch of pharmacy could not be made sufficiently interesting and important to warrant its institution. Professor Procter then formulated this course, and after it had been tried one year it was found to be so eminently successful that from that time on pharmaceutical education received a great impetus. And that plan has been adopted in at least all the old line colleges that I know of—that is, the colleges in the large cities that are conducted by associations of pharmacists. Of course, almost every one here is familiar with Procter's classification—beginning with the drugs that contain starch, etc., and passing on to those whose active principles are dependent upon resins, oils, balsams, down finally to the alkaloids, winding up with animal drugs, so that those drugs are considered together that have similar constituents. It is not that one alkaloid is taught one day, and another next week or the next day, as was stated a few minutes ago.

MR. KREMERS: I would like to know of one family or one genus, or the several species from one genus of plants, in which the constituents are uniformly of the same character. I could mention mydriatic alkaloids, where we have a few similar in character, and a few that are exceptions, but as a whole you have not such uniformity. Furthermore, suppose a drug contains more than one constituent,—suppose you take the volatile oils, can you consider them from a uniform standpoint? What is a volatile oil, anyway? Chemically, you cannot define it.

MR. HALLBERG: The course provides for these exigencies. Drugs containing volatile oils are classified as such; those containing resins, according to Professor Remington's classification, are subdivided into "those that contain resin and soft resin, with extractive," etc. Those whose active principle is chiefly tannin are the astringent drugs; and so on. In other words, considering the drugs according to the chemical relation of their important constituents, constitutes the branch of pharmacy as arranged in the pharmaceutical colleges.

MR. EBERT: Mr. Hallberg is talking about the chair of pharmacy, and Mr. Kremers about the department of materia medica. If the speakers would confine themselves to the subject, materia medica, and the subdivision of it, we will have no difference of opinion, and, I think, Mr. Hallberg will agree with Mr. Kremers.

MR. HALLBERG: The statements made by Mr. Kremers related to the instruction in colleges from a general standpoint.

MR. REMINGTON: One of the difficulties, I take it, has been that Professor Kremers has considered the subject of materia medica without also thoroughly taking into consideration the needs of the institutions. It makes a vast difference regarding the courses which are outlined, as to the number of students that are in the institution, and the methods which are to be used. I think that Professor Hallberg has taken it from the pharmaceutical, and Professor Kremers from the materia medica standpoint. Now, it strikes me that the whole subject has to be considered. You cannot take a course of instruction which one professor in one institution thinks is proper for that institution, and compare it with that which is used in another, always, for this reason: In every properly constituted college of pharmacy—and I say this without any fear of contradiction—it is absolutely necessary for the Faculty to consult together. The professor of materia medica consults with the other professors, and while it may be advisable for him in his own department to cover the whole ground himself, it is found that by a division of labor among the three he can leave certain things better to his colleagues, and that must ever be, and any college of pharmacy that is not constructed on such a basis must

always be a one-sided institution, and its men go out lob-sided. Therefore, you cannot take any one department in a college of pharmacy, and reviewing it say: "That man is not giving enough chemistry, or that one enough botany, or enough of this branch or the other." Take the whole instruction, and judge of it as a comprehensive course, and then you get some idea of it; but it is manifestly unfair—and, I think, so far as the criticisms are concerned, that it is not right—to view it otherwise.

MR. ECCLES: I did not feel that anything Mr. Kremers said was injurious or reflective upon myself in the least, and I don't think that the other doctors did. We simply did not agree with all his conclusions. He drew conclusions from certain things, and has done so again in this debate. He stated, for instance, that it was exceedingly difficult and exceptional to group alkaloids of similar physiological characteristics into one order. Now, I do not think that that is exceptional; nor is it the case with the essential oils.

THE CHAIRMAN: We might go on and discuss this subject indefinitely. There is little connection between this and the subject under discussion.

MR. MAISCH: There is one subject to which attention ought to be drawn. Stress has been laid by the author upon taking up the different subjects successively. There is no doubt whatever that in studying materia medica, as it is usually conducted, young men are to some extent at a disadvantage; because even if the fundamental branches, medical botany, chemical physics and inorganic chemistry, are taken up in the first year, it is certainly true that, when studying materia medica in the second year, the students get in the first few lectures to hear names of compounds which have not been reached in the lectures on chemistry or pharmacy. They are taught that certain drugs contain alkaloids, and they do not know anything further except from what they have read in the books, or have been incidentally told in the lectures on pharmacy and materia medica, because the lectures on systematic chemistry have then usually not extended to those principles. That is one of the drawbacks to which Professor Kremers has drawn attention, and it is one that certainly does exist. In some of his remarks, I think he has overlooked the fact already pointed out; considering materia medica as a special branch in comparison with materia medica as he has outlined, there should be taken in consideration in reality the volume of instruction given in the colleges and schools of pharmacy, not only one single branch—and that point of view has also been left out of consideration by some of the speakers.

I wish to make a correction of one of the remarks made by Mr. Hallberg: it is in relation to the Syllabus of Professor Procter. If I remember correctly, it is stated in the preliminary remarks to that Syllabus, or in the short preface, that Professor Procter never claimed originality for that Syllabus. It is based, as Professor Procter himself admitted,* upon the system of teaching that had previously existed in Paris, and that was elaborated by the elder Soubeiran. It was adapted, as a matter of course, to our American needs, and was considerably modified by him.

MR. REMINGTON: As a matter of history, I would like it to go on record that the chair on pharmacy was instituted in 1847. I will say for the information of members that the Syllabus will be found in the Proceedings of 1858.

The following paper was next read:

* See Proceedings A. P. A., 1858, p. 134.

## THE HOSPITAL STEWARD IN THE U. S. MARINE HOSPITAL SERVICE.*

BY L. A. DUCKERT, HOSPITAL STEWARD U. S. M. H. S.

For the benefit of the younger pharmacists, and at the request of some of my brother-members of the Association, I submit the following paper on the duties and requirements of the hospital stewards in the U. S. Marine Hospital Service.

The general duties of a hospital steward are to superintend the attendants and see that they are properly performing their allotted work, to procure the subsistence and other supplies, and to issue the same to the cook or patients, to preserve order in the hospital and on the government reservation upon which it is situated, to compound and dispense the medicines prescribed, and to keep all the records and accounts pertaining to his station. In other words, he must be a competent pharmacist, a good book-keeper, must have some executive ability, and sufficient knowledge of mechanics to superintend repairs, etc.

His skill as a chemist and manufacturing pharmacist is often brought into play; for when out of certain articles in the dispensary, he finds it better to manufacture them than to await the arrival of the requisition for medical supplies from the department at Washington.

To manage properly the business portion of the average Marine Hospital, requires men of more than ordinary ability, pharmacists, educated men and gentlemen.

To gain admission to this branch of the service as Hospital Steward the applicant must file his application with the Surgeon-general of the U. S. Marine Hospital Service, Washington, D. C.; when, in the course of human events, a vacancy occurs, for few die and one seldom resigns, he is notified to appear for examination, consisting of practical pharmacy, chemistry, book-keeping, arithmetic, orthography and penmanship, and must also be prepared to undergo a searching physical examination. Should he pass the examination successfully, he will be appointed a Hospital Steward of the third class, at a salary of $480.00 per annum; at the end of the first year and upon the favorable recommendation of the officers under whom he has served, he will be promoted to the second class, salary $600.00 per annum; and at the end of the second year, on the same conditions, to the first class, salary $720.00 per annum.

In addition he will be allowed, when on duty at a hospital, furnished quarters, subsistence (for himself), fuel and lights; and when on duty at stations where there are no quarters belonging to the service he will, in lieu thereof, be allowed $25.00 per month.

This may seem a fairly good salary to the average drug clerk, but it must be borne in mind that there is no further advancement than to the

*Published with permission of the Supervising Surgeon General, Marine Hospital Service, dated May 13, 1892.

first class, $60.00 per month, and no prospect, at present, of anything more.

It must also be remembered that the duties, if conscientiously discharged, are arduous, multifarious and exacting, and are decidedly different from those of apparently corresponding positions in the army and in navy.

The service being semi-military, the hospital steward is required to provide himself with a dress and a fatigue uniform, one of which he must wear at all times while on the reservation.

On motion of Mr. Whelpley, the papers read during the session were referred for publication.

The Chairman read the decision of the Supreme Court of Michigan, sustaining the pharmacy law of that State. This decision is incorporated in the report on legislation.

The Section now adjourned until 3 p. m.

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SECOND SESSION.—MONDAY AFTERNOON, July 18.

The Section was called to order by Chairman Stevens at 3 o'clock. The minutes of the previous session were read, and on motion approved.

THE CHAIRMAN: The advisability of altering the system of prize-giving in pharmaceutical schools and colleges is a subject upon which Dr. Hoffmann will make some remarks:

MR. HOFFMANN: It has been customary, for a number of years, in most colleges of pharmacy, to give prizes to students and graduates for diligence and superior showing at examinations. These prizes consist of medals, microscopes, balances, books, and sums in cash amounting from 15 to 100 dollars. This is all very well for the recipients, but it does not benefit them much, nor the colleges and the cause of pharmaceutical education. In many cases it may rather tend to impart to the recipients the vain-glorious idea that they know a great deal, when there is plenty of room for more solid and riper knowledge. In any case, these young men are obliged to the colleges of pharmacy, and not the colleges to their students and graduates. The fact is that the students come to the colleges for their own advancement and interests; they come to learn and to profit for life, and not for the college. If they utilize the instruction offered them and make proper use of their opportunities and time, they derive so much intellectual capital and enduring acquirements that any additional bounty in the shape of prizes is inexpedient and unjustified. The amount spent annually in this manner by colleges, alumni associations and members of the Faculty is collectively a large one. None of our universities spend funds in this way; they aim to incite and assist specially talented graduates by extending to them either university scholarships, admitting them free to post-graduate courses of higher studies in special departments, or endowments of several hundred dollars per annum for following higher courses of learning at German universities.

In consideration of the remarkable statement made by Professor Kremers in his able

and timely paper, that no less than eighteen professors with little or no pharmaceutical education or experience at present are engaged in teaching pharmacognosy at colleges of pharmacy, would it not be better and in time to change this abnormal condition? To commence with, this may be initiated by the colleges of pharmacy by following the example of the universities. If they would concentrate their munificence towards the creation of an endowment fund at each college, they would soon be able to induce and encourage specially proficient and qualified graduates, who give promise for more than average attainments, to follow higher educational courses. By the present system such men are sent off at the Commencement with undue flourish and ephemeral prizes, and return into the ordinary trade channel, and mostly are lost for higher application and the cause of pharmaceutical education. With the substitution of endowments in place of prizes, colleges of pharmacy may gradually secure as successors of the present generation of teachers, men of riper scholastic and pedagogical training, at the same time familiar with the practice and the details of pharmacy from the bottom up to the highest round of the educational ladder. The opportunity for granting such endowments will not come in succession every year; promising and deserving talents are rare and to no less than such should such an inducement be offered.

These suggestions are offered to your consideration and to that of the colleges of pharmacy and their alumni associations, and to the Pharmaceutical State Associations. They may serve to inaugurate the proposed change from useless prizes to useful endowments, and, in time, secure from the ranks of pharmacy a staff of qualified specialists able and ready to fill any chair in pharmaceutical schools with efficiency and credit to the institution. Then the colleges will not any more have to draw for teachers upon the medical profession. Such a change would, in time, largely benefit the colleges and the advancement of pharmaceutical education.

THE CHAIRMAN: This subject is a very important one, and one upon which we should be glad to hear from other members, especially those connected with the older colleges in the country.

MR. ALPERS: Although there is no doubt that this subject is a very important one and worthy of discussion, yet I believe that Dr. Hoffmann is wrong in some of his statements. In the first place, these so-called prizes, consisting of a gold medal sometimes, or so much cash, we all know are not given by the colleges as such, as a rule. They are generally instituted by some well-meaning friend of the college, who gives a certain sum of money, the interest of which is to be used only for a certain purpose—to buy gold medals, etc.—for certain students in certain branches. Therefore, it is entirely out of the power of the trustees of a college, or the professors, or any one else, to devote these bequests to any other use except the one that was originally intended. How such a use should be detrimental to the interests of pharmacy, I really cannot see. The system of giving scholarships to deserving students is, I believe, followed in some colleges. But suppose there were more scholarships of this kind given, which would be a desirable thing to do, I do not see exactly how the object which Dr. Hoffmann had in view, to get a better class of teachers for the colleges, could be advanced in any way. I do not wish to admit that there is a deficiency of good teachers in this country for colleges of pharmacy: I think just the reverse. I believe the average teacher of pharmacy in an American college is as competent as the European. But even admitting that, I do not see how this state of affairs could be remedied by giving some students scholarships. They go to the colleges of pharmacy not to learn to teach, not to become prominent in one certain branch, but to become practical pharmacists; and while giving scholarships might make better pharmacists, it would not make better teachers. Otherwise, the idea is certainly worthy of consideration. The question of scholarships, however, has, I fear, been left in rather a vague condition. If Dr. Hoffmann means that the Association, as

such, should create some scholarships, the great question would be, in what school? It seems to me, however, that all we could do here would be to recommend that such a system be adopted.

THE CHAIRMAN: It is understood that this Association is not expected, at this time, to give anything. We bring up a great many subjects that we do not expect the Association to take action upon. But this Association ought to bring forward suggestions that may benefit colleges of pharmacy, and, if necessary, be adopted by them.

MR. HOFFMANN: I did not intend the Association to give prizes. If Mr. Alpers knows anything about American pharmacy, he will know that the younger talent are the very men I have pointed out. They go abroad for two or three years to accomplish the study as is done in any university. There is hardly any professor of higher education in this country who has not derived his final education in Germany. As to this Association creating scholarships, I said nothing about that.

MR. SIMON: I very well understand the drift of Dr. Hoffmann's remarks, and I would like to say a few words in regard to some of the points. The fact that many of the professors of pharmacognosy are M. D.'s I think can be readily explained by the fact that while they have been pharmacists they have taken a course in medicine. I could point out a number of members present who have done this, but I do not know of a single teacher in that branch in any pharmaceutical college whose education has been chiefly a medical one. In regard to the prizes as suggested, a great deal can be said for and against it; but I will remind Dr. Hoffmann of the fact that every one passing an examination in the European universities competes, to some extent, for a prize; that is, in passing his examination, he receives a number, 1, 2, 3 or 4. In passing his examinations for, say doctor of philosophy, a distinction is made, which is mentioned. There is a grading in all examinations, and that is also done in England. So much in regard to the matter of giving prizes. I must say that I have never seen any disadvantage in giving prizes; in fact, it acts, to some extent, as a stimulus among the best students; and that we have occasionally some disappointment and a little jealousy is not sufficient reason for doing away with prizes as such. As far as the other plan is concerned, of giving the students the privilege of attending the colleges longer and creating scholarships, I would say that the pharmaceutical colleges, in the majority of cases, are not places where the students can obtain sufficient knowledge to act as teachers. After they have passed through our colleges, they ought to go, in most cases, to other places of learning, and it would therefore take a considerable endowment to enable the young men to visit other institutions of learning, in order to become suitable teachers for colleges of pharmacy. Moreover, the better men among our graduates have a chance to avail themselves of the opportunity of gaining further knowledge by taking the assistantship in the various laboratories, where they have an excellent means of acquiring further knowledge while they not only do so without expense, but even receive a small compensation, which, in most cases, is sufficient to pay their board, and the best men in the class generally avail themselves of this opportunity.

MR. HOFFMANN: It seems to me that Mr. Simon misunderstood me. He speaks of endowment in the line of scholarships. I did not mean an endowment with a special view to the young men becoming assistants of the professors, but an endowment to enter Johns Hopkins, or Yale, or Harvard, it may be, to educate themselves in other directions, and not alone as help to the special professors, or as assistants. By scholarship I meant an endowment and nothing else. About $500 a year, I should say, would enable the young man who has not the means himself to go abroad for two or three years, for instance. Some universities here not only give a scholarship, but an endowment, and

permit the student to go wherever he thinks he can get the best education, if he will fit himself as a teacher in any special department relating to science.

MR. SIMON: In speaking of scholarship, I took the view that Dr. Hoffmann referred to the mother institution, because the term "scholarship" implies that. If it were to be an endowment to send the young men to some other place of learning, I would be in most hearty accord with the sentiments he has expressed.

MR. ALPERS: Allow me to remark that I had the same impression. I took the word "scholarship" as implying a means of helping them to complete their studies in this country at the regular school, and not in the sense of an endowment to go abroad, as Dr. Hoffmann now explains.

MR. ECCLES: If Dr. Hoffmann had been distinctly understood there would have been no discussion on the subject, for I do not think any one would object to the proposition he has made. It is in the line we all want to work. But in connection with this, I think there ought to be something in the shape of post-graduate instruction in our colleges of pharmacy, as there is in the medical colleges, and Dr. Hoffman's suggestion of taking the best of our men, and having an endowment to enable them to carry on their education in some of the higher educational institutions, I think might be extended somewhat by providing post-graduate courses in some of our own colleges in some of the centres where there are pharmaceutical colleges at present, and these would be accepted also by the majority of the graduates. You will notice that the medical men are doing this all over the country; there are post-graduate colleges in Chicago, Philadelphia and New York for medical graduates. I think pharmaceutical graduates ought to have a similar opportunity.

MR. KREMERS: I hadn't heard Dr. Hoffmann's suggestion originally, but I would say in support of the same that the University of Wisconsin has been endeavoring to obtain a fellowship for the college of pharmacy, and I think the use of the word "scholarship" instead of "fellowship" has given rise to this discussion that I have been listening to. The Wisconsin Pharmaceutical Association has heretofore advised this course. Furthermore, it is customary for many of the state pharmaceutical associations, and for the wholesale drug houses, to offer prizes of various kinds, often of a trivial character, which are given to men who have made the highest base-ball record, or the longest jump, or devoured the most pie and crackers, etc. It has been my endeavor to press the argument, that money expended in that way could be laid out to much better advantage; and, if necessary, I know there are many druggists in the State willing to contribute five or ten dollars annually, and make up a five hundred dollar fellowship. The applicant for a fellowship would be a graduate either of the school for which the fellowship is established, or, if such school prefers, they may open the fellowship to applicants in general, to graduates in particular departments who may wish to extend their studies. Studies of that kind are always of an advanced character, and supposed to be post-graduate studies, and the pharmaceutical colleges could not do anything better to advance pharmacy than to establish as many fellowships as possible, even if the men who apply for these fellowships do not all intend to become pharmaceutical teachers. But the real gain that pharmaceutical science would derive from such work would alone be worth ten times the amount that would be expended in that direction.

THE CHAIRMAN: In some of the State associations, it has been suggested that the pharmacy examining boards should not examine any applicants but those who hold diplomas from colleges of pharmacy. Mr. Alpers wishes to introduce the subject.

MR. ALPERS: At the last meeting of the New Jersey State Pharmaceutical Association, a resolution was offered that after this no applicant for registration should be examined

by the State Board of Pharmacy unless he held a diploma from some college of pharmacy in the United States, or some corresponding college. This resolution was discussed at length, and brought out a number of peculiar remarks. The resolution itself was finally referred to the Legislative Committee. because there were doubts in the minds of many as to whether such a course would be legal, as some thought that the board of pharmacy was compelled by law to examine anybody who might come before it wishing to be examined, and had no right to make any distinction between the applicants. Whether this is the case or not we shall know next year, and it may, probably, be reported to you at the next annual meeting. During the discussion, I was requested, if there were an opportunity, to bring this subject up in the American Pharmaceutical Association. What I am about to say is nothing official, or anything that the New Jersey Association has decided upon, although there is no doubt whatever that that resolution would have passed there if the legal objection had not been raised, and we did not care to pass it until we were satisfied that the objection could be removed. If the legal objection is sustained, we shall try to get along without legislation.

In the discussion, one speaker said it was a disgrace in itself that a young man who came before the Board with a diploma from a college should be obliged to undergo examination; that the diploma was sufficient evidence of his ability to conduct a drug store. Another one said that he felt that the most incompetent person to put in charge of his store was a pharmacy graduate, and he cited a number of instances. A graduate of a college jumped up and said he had a diploma from a reputable college, and came before the State Board, and they gave him so many ridiculous questions that he failed. He claimed that the Board examinations were too severe for anybody. Then, again, it was said that many colleges were colleges in name only; that they had no teachers who might properly be called teachers, that they were druggists, keeping a drug store, and considered the teaching in the college merely as a side issue; that their point was to make money in their own stores, for where a man's money is, there his heart is, and that the business of teaching with them was an insignificant matter, and they could hardly be called scientific men. Again, it was said, as we heard this morning, that the short course in a college, of two years, and in some only twice in a few months, was entirely inadequate to the subject, so that the fact that a man had been there six months or twice six, and received a diploma, was no evidence at all that he was proficient. All these remarks, as I said, were not intended exactly to discuss the subject at issue, yet they had a very important bearing on many members who had given the subject a good deal of thought, and it is a subject that should come up here and be discussed.

The idea that only graduates of colleges should be admitted to examination before Boards of Pharmacy, and thereby graduates of pharmacy only be admitted to the profession, so that only such could, after a while, become pharmacists, is certainly a great step in the right direction, if it can be done. Just consider what an important help it would be to the colleges if nobody after this could come before a Board of Pharmacy for examination unless he had a diploma. I will state here that our body, in making this proposition, did not suggest that the New Jersey Board of Pharmacy was not as competent as the professors of a college to examine a candidate. The idea was this: We wanted clear evidence from every man that came up before our Board that he had sufficient theoretical knowledge, and we might restrict our examinations to practical matters. This was the leading idea. You can easily see that if only a few states were to attempt such a course, these states would have the best clerks in the country. The poor clerks who are not graduates would be driven into other states, and these states would be compelled to follow. I believe that no more important step could be taken for the elevation of pharmacy than this. On the other hand, the discussion showed another side of the question. There were, in our Association, a number of graduates of colleges who gave their experience, and each thought his college was the best. One thing is

certain, the colleges themselves, through the trustees, should put their professorships on such a footing that a man who is a teacher need not look for any outside occupation. Until that is done, the American college cannot claim to have the same standing as the European college in scientific matters. Another step that the colleges should take is to extend their course to three years, as was advocated this morning by Professor Simon; it would likewise result in the elevation of pharmacy.

I would like to make a motion to that effect, that it is the sense of this Association that no person should be admitted to examination before a Board unless he is a graduate of a college of pharmacy, and yet I hesitate to do so, because I would prefer first to hear the opinions of others, as to whether this subject is regarded in the same light as I regard it.

MR. WATSON: I do not think that such a proposition should be worthy of a moment's consideration. We often find that a poor boy who has no means of attending a college, has, after years of patient study in the store, and application to business, become, in many respects, just as good and practical a druggist, and as well educated, as one who has graduated at a college of pharmacy. That such a one should not be allowed to pass the Board of Pharmacy, but be outlawed because he has not had the means to attend a college of pharmacy in the first place, is altogether wrong. It is perfectly apparent that no such proposition could be entertained by the law, and if it were I shouldn't think that any man would be willing to permit such a law to go into effect without a protest. It is utterly opposed to every principle upon which our government is founded.

MR. SIMON: I have listened, with a great deal of interest, to the remarks made, because I feel exactly as the speaker, that it is a step in the right direction, and because the remarks were made by one who happens to be in a state that has no college of pharmacy. If these remarks had been made by one from Philadelphia, Boston, Baltimore, or New York, where we have colleges, it might have been looked upon as trying to get larger classes. As far as the legal aspect of the question is concerned, there can be no difficulty whatever, because it is exactly what the physicians do. There are many states which have no university, but Boards of medical examiners, and every applicant is bound to have a sheepskin proving that he has attended college and obtained his degree of M. D., and a number of States in which medical colleges are flourishing, now have medical boards of examiners, and every man, no matter whether he has passed an examination in his own State or another—has to go before this medical board in order to become a registered physician.

In regard to the remarks made here a minute ago, I will say that I was under the impression, thus far, that every member of the American Pharmaceutical Association sees the necessity for raising the standard of pharmacy, and that every member concedes the fact that this can only be done by getting really educated men into the profession. I am surprised to hear that some members think that the education a young man receives in an out-of-the-way drug store, where patent medicine selling is his chief business, is such an education as he would have after passing through a good pharmaceutical college.

MR. FENNEL: I did not intend to enter into any discussion in this Section at all, but all remarks made this morning and this afternoon reflect on the ability and capacity of the teaching element in our pharmaceutical colleges. It seems from the statistics that are presented by our Secretary, Mr. Hogan—of which he failed to make a summary—that the results obtained by pharmaceutical education are not such as were desired or hoped for. Somebody has to be blamed for it—the teaching elements are at fault, and not the material that enters into our institutions. If this Section wishes to do anything to raise the standard of pharmacy, every reputable college should be induced to make an effort to get

good material. The seed sown in our colleges falls on barren ground in the great majority of cases, and you cannot expect any good results. In regard to the statement made by Mr. Alpers, that no applicant before a state board of pharmacy should be admitted unless he has a certificate or diploma from a college of pharmacy, it should be objected to. There is no first-class institution in any State that has any fear for its graduates going before a pharmacy board, and undergoing an examination, and therefore colleges should object to any rule which would admit a graduate without any further examination.

THE CHAIRMAN: He said that they were not to be admitted to examination unless they were graduates.

MR. FENNEL: Well, put it in that way, what will be the outgrowth? It will be the formation of drug-mills, and that is all. Any man who has a diploma will be admitted to these examinations. Will that elevate the standard of pharmacy? I say no; it will lower it. Raise the standard of admission to the institutions, or, if they must have a diploma, let the college of pharmacy devise some plan and lay down the requirements of that institution, and then make that the consideration for the student's appearing before a state board of pharmacy.

MR. ECCLES: If we look at the history of medicine in the United States, since its earlier days, we shall find that it has gone through a series of steps of evolution that are very much like those that pharmacy is going through now; that the same causes were in operation then as are in operation now, and that the same effects may be expected in future, whether good or bad, as have already transpired in medical science. Medical men were admitted to the practice of medicine, not very long ago, in the United States, by licenses from county societies, after brief examinations from boards of medical men, similar to our own state boards of pharmacy. After a while, it was found that this did not raise the standard of medical education fast enough, and the result was that medical colleges began to multiply and degrees of medicine were sent out; and, as the medical men who had degrees began to multiply, they wanted, of course, to raise the value of their own diplomas, and they hastened this along by combining to refuse to acknowledge the certificates of the licentiate boards, and the boards began to die out. Then came a period in which diplomas alone were acceptable, and men carried their diplomas, and were registered on the diploma only. After that followed another period in medical history, in which the state said, "This is hardly the thing, because there are a good many medical-mills passing men without sufficient education," and a state examining board was appointed, and that examining board had a right to refuse certain colleges recognition that did not come up to a given standard. And then came another period in which examination was made of all. Such is the state, I believe, or is intended to be the state of affairs in New York at present.

Now a history of this kind can be readily foreseen if you will look at all the facts, that is, the dynamic forces at work—not speaking of the right or wrong, but from the standpoint of a man who views social problems the same as he would the motion of a body of water. If you stand in front of that body of water you will only get drowned yourself. The tendency of the body of water, as seen by the history of medical science, and the briefer history of pharmaceutical advancement, is in the direction that this member is advocating, be it right or wrong. But a new element has stepped in, for this gentleman has pointed out that there is an injustice there; and so we find that all over Europe and America university extension is being taught and being comprehended in every direction, and efforts are being made to extend university privileges to those who cannot enter a university and be educated. University education, by the aid of Mr. Hallberg, has been started in the United States as far as pharmaceutical education is concerned. The consequence is, that this will be a modifying element, and the two views held by these gen-

tlemen will be welded, the result being perfect harmony by the acknowledgment of good men who are not able to pay for admission into colleges, but who can, by the university extension method, get a degree, under the same privileges as those who enter the college and gain a degree. I haven't a doubt that there are many here who will see the day when this gentleman's idea shall reign supreme in the United States.

MR. HALLBERG: I believe one of the reasons why many foreigners become citizens of the United States is because they are pretty well convinced that the conditions of this country are almost correct, as far as they relate to questions of this character, that individual effort alone should be the point of final determination, if I may call it such. I believe, with Mr. Watson, that it seems an injustice to dictate to any man how he shall acquire a certain educational qualification, if he can only acquire it to the extent of being able to demonstrate that qualification before men chosen for that purpose; but, unfortunately, there is no method of examination sufficiently adequate to determine whether the qualification is what it should be. The average State Board of Pharmacy certainly does not determine the qualifications of the vast majority of the young men who come before it for registration. Dr. Eccles has referred to the system of university extension which I formulated in 1885, and have carried on ever since. I would be in favor of the proposition of Mr. Alpers, if for no other reason than that of preventing young men from passing an examination of the majority of State Boards before they have finished what I consider a preliminary course. It is not very difficult for an ordinarily bright young man with two, three or four years' experience in the drug business to pass the average Board examination, and therefore, theoretically, I am in favor of any measure that will, if necessary, compel young men to obtain an education on the best possible plan. If it were practicable, it might be wise to follow the course pursued in England, where the Pharmaceutical Society of Great Britain prescribes a curriculum before candidates can come up and pass an examination, or at least attempt to pass, whether they are students of the college of pharmacy of Great Britain or not. They must show that they have gone through a certain curriculum. If that were possible in the United States, I would be in favor of Mr. Alpers' proposition, but I do not think it is possible. I believe that the only method is to compel the rising generation to obtain a systematic education such as is conducted in our colleges, if possible; to formulate a curriculum for the guidance, and to be a standard, for the colleges of pharmacy; but not, however, to endeavor to compel young men to conform to this until after a certain period, so as not to affect any man at present engaged in the business. Let it be done in the same way, for example, as was done by the State Board of Pharmacy in Illinois, a few years ago, which had a law passed to the effect that after about three years (and we might make it five years hence) any young man who desires to go before a Board of Pharmacy and become registered as a pharmacist or as an assistant, shall show either that he is a graduate of a college of pharmacy which has adopted the curriculum formulated by the American Pharmaceutical Association, or that he has followed a similar curriculum. I believe that by giving notice beforehand, pharmacists generally would be educated up to the point, and it would work no hardships such as referred to by Mr. Watson. If any worthy young man should be prevented from becoming registered as a pharmacist simply because of a lack of means to attend a college of pharmacy, I think it would work an exceedingly great injustice. I believe, also, that Professor Fennel's proposition that the teaching in our institutions is not conducted, perhaps, according to the very best methods, and that they ought to be uniform, is correct. There are now in the State of Ohio six institutions teaching pharmacy (that is probably three more than most of you are acquainted with) and out of these six three are located in the three "C cities"—Cincinnati, Cleveland and Columbus. The others are in small places, where they have—in at least one or two—as teachers of pharmacy, men that nobody ever heard of in pharmacy. At

the same time, you cannot make discrimination between the diploma of the one and the other. I would approve of Mr. Alpers' suggestion if it were placed in such a manner as to show the sense of this Association, and presented in such a shape as not to work any hardship against the young men.

MR. WATSON: Professor Hallberg has expressed my idea exactly. No man on the floor is more in favor of elevating the standard of pharmacy than I am; but, at the same time, I do not believe in doing an injustice to men who are not able to obtain an education through the medium of colleges.

MR. MARTIN: I don't know whether we should be doing a great injustice to many men, or whether, in fact, we would be doing an injustice at all. We find that among the students of the different colleges in the country, as a general rule, it is the poor young men who are the hardest workers, being compelled by force of circumstance to be so, and usually they have the greatest ambition. On the other hand, we know that our pharmacy laws are not made for the benefit of individuals, but are supposed to have been made for the public at large, to protect the public, and for that reason individuality would certainly sink into insignificance. I think it would be a good thing if graduation from some college of pharmacy could be made a necessary qualification for coming before the board of pharmacy for examination, for this reason, that it would give a national standard all over the American continent, and would clearly bring the examinations of the different boards of pharmacy on a more even basis. I do not see where any injustice could be done. It would not necessarily be done immediately, but as Mr. Hallberg suggests, gradually; but in any event it would be a good thing to do.

MR. CHURCH: I am in favor of this proposition. I don't know that the time is yet ripe for it here, but almost all fruit ripens by degrees, and if we do not set our stakes a little ahead of us, we are not going to advance. In regard to Dr. Eccles' illustration of getting before the stream, if he means these mountain streams here, I would remark that they all flow downward. Now, we don't want to go downward; we want to go up.

MR. ECCLES: "Up and down" are relative terms, and have no meaning except in relation.

MR. ALPERS: I said before that I hesitated to offer a resolution, as I did not know how the Association would accept my proposition. I am very much surprised and pleased to see that the majority, with but one or two exceptions, think as I do.

As I stated before, the object of our Board in New Jersey, in formulating this resolution, was that we wished to be relieved from the necessity of entering into a theoretical examination of the candidates. The Board of Pharmacy of New Jersey is composed of practical men; they happen to be all graduates just at present, by mere chance, not picked out for that reason. We do not wish to be bothered with examining the candidates theoretically, because we ourselves feel that we are not perfectly competent to do so—not that we have not been trained originally as professional men, but you know well enough that if a man devotes all his time to practical business he is not in a position to do much theoretical work. We want to confine our examination to practical matters, and give the man who comes up for examination certain drugs, tell him to put up prescriptions, make some preparation before our eyes, and let him decide about the quality of samples, the impurities they may contain, and so on. Such are the questions we believe are the proper ones to use in an examination by a board of pharmacy, and not the theory of pharmacy, which belongs properly to the college. I cannot agree with the objection that poor men would be excluded by such a rule, since, as has been stated, the poor men are frequently the best students. In no profession is greater facility afforded for poor men to attain knowledge than in ours. The physicians certainly do not consider when

they formulate their laws whether a poor student of medicine will be able to get a diploma or not; such a question is never entertained. And in our case we are not legislating for the rich or the poor, but for pharmacy. If a clerk is fit to be what is termed a junior clerk, after he has been two or three years in a pharmacy he can always find a means of attending a college—at least, in the large cities. I can recall two or three instances of this. One poor boy, that I picked up from the streets, the son of a laborer, I employed in my store to wash and clean, and as he was an industrious fellow I kept him and taught him the business. He eventually attended the New York College of Pharmacy, although he had the additional expense of traveling from Bayonne to New York every day, which cost him $30 a year. He paid it himself, saving it out of his wages, and is to-day a graduate. I know of other instances. There is always a place for young men who want to attend a college. The objection is raised that they have not time to study, but a young man who is ambitious to become a pharmacist finds that time. He understands how to unite practical work with theoretical study, and generally "gets there."

At the request of Mr. Alpers Mr. Hallberg prepared, and presented the following:

"*Resolved*, That it is the sense of this Section of the Association that a theoretical education obtained through pharmaceutical education in a college of pharmacy be approved as a requirement for examination and registration for pharmacy in the nearest possible future."

MR. DADD: I would like to add that no member of the Board of Pharmacy should be eligible for that office unless he is also a graduate.

MR. TORBERT: I did not intend, when I came in here, to make any remarks referring to this question; but now it is before the Section on a vote, and if acted upon affirmatively, I apprehend that nothing would be gained by it. To my mind, there are some objections, and if they have anything of value, I know that I am addressing men of large intelligence, and they will recognize it, and if they have no worth they will also recognize that fact. In the first place, what advantage will be gained by the American Pharmaceutical Association in asserting that proposition? What legislature, in what state, will be governed at all by the action we may take in that direction? Will it have any effect? If not, what is the advantage of the assertion? Secondly, I apprehend that what we are all seeking is the very highest elevation of pharmacy, the very highest standard for the admission of candidates into the pharmaceutical profession; but does it not happen, by the admission here to-day of these men who teach in colleges, that there are pharmaceutical colleges in this country where the curriculum is not what it ought to be, where men graduate who are not so well qualified to be admitted into the ranks of pharmacy as men who have never been inside of a college? I would instance to you that within this current year a certain man who has graduated in a college of pharmacy has applied three times to a Pharmacy Board to be examined, and three times signally failed; and when the attention of the professors in that college was called to the fact, they themselves were astonished, and wondered how it happened that this man had their diploma. Now, this is a fact, and it can be made apparent to the legislatures that such a condition may obtain. I submit to you that when a man comes up to the Pharmacy Board to be examined under these circumstances, the simple fact of his graduation is of no advantage to him at all, though, of course, such cases are rare. I take it, as the gentleman from Florida stated, that in this country we do not need to institute restrictions that would bar out any class from entering pharmacy. There is plenty of room at the top for every pharmacist, and if a man shall come before a competent Pharmacy Board, and shall show

that he has in any way whatsoever acquired the intelligence and ability to be a pharmacist equal to that of any man who has graduated in a pharmaceutical college, I submit to you, gentlemen, do you propose that a man that has such competency as that shall be barred, if, for any reason whatsoever, he has been unable to go to a pharmaceutical school? We do not need to fear; the tendency in this country is everywhere and always for a higher standard along all professional lines; and if it shall happen that the pharmaceutical school now or hereafter shall be the only qualification to produce men of the greatest capability, for men to compete, and that those men have to go through the curriculum of our colleges, that will come naturally, inevitably, irresistibly; and why, then, does this Association, in advance of that condition, need to assert itself in this way? I am opposed to this resolution for the reasons I have stated, and I hope the Association will do honor to itself by voting negatively.

MR. GOOD: So long as this question was before us to be discussed in a desultory way, I was contented to keep my seat, although somewhat irritated by the discussion. But when a motion is made, and the matter takes a formal shape, and we are expected to say to the country that we express by the sentiment contained in that resolution, I find it impossible to contain myself. No one can accuse me of belittling pharmaceutical education. I have been connected with educational interests all my life, in one way or another. I know the value of the proper courses of education, of particular means of instruction which shall take hold of a boy and educate him, but will not discriminate between the man who holds a diploma, whether from a college of pharmacy, or Yale, or Harvard, and another who may acquire education and make himself competent in whatever way he can. We cannot afford to pass such a resolution as that, or have it said of us that we will thus discriminate and are trying to play into the hands of the colleges. It looks that way, and we cannot afford to make any such condition, especially on account of the colleges themselves. The multiplication of colleges and diploma-mills will begin at once. The conditions are not identical with those of the medical schools. Ours is a business as well as a profession—in fact, we know that not one hundredth part of the druggists of this country are graduates of colleges of pharmacy. We would like to pass on their competency by a proper Board, and if any one acquires the proficiency that we demand and is able to show it before a Board of Pharmacy, that must satisfy us. The one who takes a course in a college of pharmacy has the advantage—we must insist upon that; and, other things being equal, he has a decided advantage; but, at the same time, it must not be made a barring condition.

MR. SHEPPARD: I am surprised at such a resolution coming before a body like this. I have served a number of years as president of a college of pharmacy, have served on a board of pharmacy; many of you, gentlemen, are in very similar positions, having served for years as officers of colleges and on boards of pharmacy. It seems to me that we could not possibly send out to the pharmacists of the country a more foolish resolution than this would be if it were passed. It seems to me that the work of this Association is not to push education in the manner that this resolution would strive to push it. We would not thereby help the cause of education. We would simply, it seems to me, put a stumbling block in the path of our colleges, and merely antagonize these men whom it is our duty to conciliate and help educate up to the right idea of the necessity of college education, which we all so much desire. The idea that none but college graduates should be eligible for examination before our boards of pharmacy would be immediately made a handle of by the politicians of every State. In our own commonwealth we went up to the Legislature ten different times, and ten times were sent back before we could get a board of pharmacy; and the argument was made almost every time, "You want a board of pharmacy for the simple purpose of supplying your college with more students." Men at the state-house told us over and over again, in good plain English, that that was why we

were working so hard, because we had a college of pharmacy to support, and we wanted to crowd the young men into that. Now, if the Association should take the action which is here proposed, that class of men all over this country would have some basis on which to fix a statement like that, and I argue that it would be one of the worst things that could happen to the cause of pharmacy as affected by the Legislatures of the different states; because in that very attempt with Legislatures in States outside of Massachusetts, they have found that politicians, the country over, are very easily influenced by arguments of that kind. It is one of the most difficult things at our state-house to get anything for the board of pharmacy that has the slightest connection with our college of pharmacy; and one of the strongest points that the chairman of our Board of Pharmacy, Mr. Whitney, has in conducting his work is, that he is in no wise connected with the Massachusetts College of Pharmacy. I certainly hope that this resolution will not pass.

MR. EBERT: Mr. Torbert has expressed the very sentiment that I intended to have voiced here, and all I want to say in connection with this matter is, that I plead for the State of Indiana. I plead so that you will not pass this resolution. I have had experience with legislation, and if this resolution were to go out from this Association, I am sure that our brethren in Indiana would not be able, this winter, to get pharmacy legislation. It is the very handle that every legislator that I have ever met makes against the laws for the regulation of pharmacy, that they are simply used and are being urged by us for the purpose of bolstering up our schools of pharmacy. I certainly hope you will not adopt this resolution.

MR. HALLBERG: In reply to Mr. Ebert I would raise a point of order. The reason why Indiana has not a pharmacy law, I was informed, in May last, at Indianapolis, is because they will not accept a law on the orthodox principle. Indiana will have a law this winter, which will require graduation in pharmacy before registration, or no law—so I was informed when the committee on legislation last met at Indianapolis.

MR. HECHLER: I hope that this resolution will not pass. It would seem almost ridiculous for us to set ourselves up here, and endeavor to pass a law involving the different states, when we have not the slightest need for interfering with the pharmacy laws. The legislatures enact the laws, and we cannot go out from a national Association and dictate to the different states. Furthermore, it might be construed by the outside world as though the professors of pharmacy here were endeavoring to work for their own interests to some extent.

MR. BASSETT: I thought when I first came in that this was an advertising scheme for the colleges of pharmacy. I have not been here this afternoon before. I am very glad to see that it is not. I wish to protest against the passage of a resolution of this kind. Speaking for Michigan, I think it would be the worst thing that could happen for that State. While I would like to see, if possible, every reputable school of pharmacy in the United States filled to the doors with students that should be turned out perfectly qualified to fill the positions in the drug business, I do not wish to see a resolution passed by this body that shall militate against a man's educating himself if he so desires. As my mind runs back over the history of this country I could easily call to mind many a man who stands high in his profession who never saw the inside of a college. I do not believe that it is time for the American Pharmaceutical Association to say that they will not recognize any man who has not been through a school of pharmacy, nor do I wish it to be understood that I desire to say one single word against the schools, for no one is willing to do more than I for their upbuilding and progress; but let me ask you, supposing it were possible, in the face of the laws of the states, to enforce a resolution of this kind, emanating from this Association, how long before we should have a college of

pharmacy in every city, town and village throughout the United States, and how much would it cost to get a diploma from certain colleges of pharmacy?

MR. SLOAN: The matter has been spoken of twice by non-residents of Indiana, and probably a word from me might be heard. Surely, if this resolution passes, it would preclude the possibility of any pharmaceutical legislation in our State. There are about 1,500 druggists in the State, and possibly do not exceed two hundred graduates. The men who control the majority of those stores would at once say that were such a law enacted, where would they secure help? and their influence would be against the law entirely. Largely, the opposition to the pharmacy laws has been from the druggists and not from the politicians. They thought it would add an additional expense in the matter of their help.

MR. ECCLES: I consider the resolution in the right direction, but it is inexpedient. I was surprised at the revision of the resolution as written by Mr. Hallberg, as I thought there would be a loop-hole of escape, but that he left out. In my remarks, before the resolution was written, I referred to the university extension plan as being the escape from the injustice which was clearly and honestly done to the poor man, and I thought Mr. Hallberg would, in his resolution, say something embracing that he must show that he has taken some sort of a course of study in pharmacy, and bring the evidence to the Board before it will examine him. That would, of course, exclude the statement that it was legislation for the colleges. The time is not yet ripe for a resolution of this kind to take effect, as it would raise a storm of abuse, as has already been shown, and it would divert attention in the wrong direction. It would simply make it impossible for us to do what we ought to do. It would rebound, like seating ourselves on a spring that would strike up and hit us in the face. The time we must wait for will be when there are pharmacists enough in the country to push this thing. The time is no doubt coming when there will be enough graduates in pharmacy, and enough students, for the colleges to do away with the Buchanan schools and fight them down, and the very thing that will fight them down and make it impossible for them to exist is just such a plan as this. A Buchanan college would be absolutely impossible under such a scheme as this, where Boards of Pharmacy would grade the colleges and the diploma would pass only for a certificate of examination, showing that its holder was worthy of examination. I think Mr. Bassett must have mistaken the resolution, because it gives no privilege whatever, except that of being allowed to go up for an examination as to the ability of the man.

MR. WATSON: You would have the Boards of Pharmacy recognize what colleges they saw fit?

MR. ECCLES: The schools of medicine cannot be taken as a precedent. There must be some recognized schools of pharmacy. I would further require, as already stated, that applicants who had not attended a college should show some certificate, showing that they had pursued some line of study with a pharmacist—not merely going through a drug store, but that they had really studied with some pharmacist and have certificates to that effect.

MR. FENNEL: I wish to state for the information of Dr. Eccles, that a reverse condition exists in the State of Ohio. We have three mushroom colleges in that state which will give a diploma from their institutions, provided you have passed the Ohio Board of Pharmacy: the opposite condition we want.

MR. HALLBERG: If I am accused of being the author of this resolution, I would state that I formulated it more particularly in response to a sentiment. I share the views expressed by Dr. Eccles. I was afraid to put in the loop-hole which he referred to, thinking

I might perhaps be accused of having a special commercial section concealed about me. I think that while it is in the right direction, we have not probably come to it yet. Of course this resolution was simply intended to express, in a general way, the sentiment of this Association, and let it at least be known to the pharmacists of the country that it is the sense of this Association that it would be best for them to have their young men go to colleges before they went before Boards of Pharmacy: then in the course of five or ten years, as this method becomes more popular than it is at present, we could possibly arrive at the point where we could say something more definite. I hope no gentleman here will accuse me for one moment of thinking that this would have any bearing whatever upon any State legislation. That of course goes without saying. It was only for the purpose of expressing, as it were, the sentiment of this Association, a recommendation, meaning practically nothing else, except that this would be a desirable course to pursue; but possibly it may be used to the disadvantage of the very course that it was intended to help, and I am perfectly willing that the resolution should not be adopted.

MR. TORBERT: Now, Mr. Hallberg, as he always does, has got the milk in the cocoanut. The fact about it is, that every gentleman in this Association stands permanently for our young men being graduates of pharmacy, and it is because, as Mr. Hallberg intimated, that there is a kind of buncombe in it that the American Pharmaceutical Association is not in the habit of indulging in, that I object to it. You understand that in the domain of those various States, the legislature is supreme. Who ever heard of Congress passing an act and then recommending it to the State legislatures? That is what this representative body would be virtually doing by adopting that resolution and recommending it to every pharmacist in the land. Do not let us pass the resolution simply for buncombe, when it cannot mean anything.

MR. CASPARI: As one connected with a college of pharmacy, I must say that I would deplore the passage of this resolution. I should not like to see the American Pharmaceutical Association place itself on record in that way. I think that the point at issue is that the apothecaries all over the country look more to the calibre of the men whom they take into their stores as apprentices, and leave the balance to the colleges of pharmacy or state Boards. There is no doubt that many a young man can become well qualified by home study and proper instruction under a suitable preceptor to pass any state board examination. The gentleman from New Jersey stated to us that the object sought is to relieve the State Board of the necessity for theoretical examination, that he wanted the colleges to take charge of that, that the Board wanted to confine itself to a practical examination; but I question whether that is altogether the proper thing. If the State Board of Pharmacy is going to examine at all, it should look to theory as well as practice, though in the main practice is the essential feature. As a teacher of pharmacy, I should strongly urge the disapproval of this resolution by this Association. I think the whole trouble in this country has been that we have been injudicious in the selection of the young men for positions in our stores as apprentices and subsequently as clerks. The American Pharmaceutical Association might, with good cause, recommend to the profession greater care in the selection of apprentices, and the pharmaceutical associations should take up the subject of preliminary education, and establish some standard.

MR. HALLBERG: If I am the author of that resolution, and in order, I will withdraw it.

MR. ALPERS: I would ask the same privilege. I am not here to force this resolution on the Association, nor did I intend, when I made my first remark, to offer it; but I simply wanted to have it discussed and nothing more, because I thought it might be of some use, and I believe it has been, thus far. It then seemed to be the unanimous sense of those present that this should be adopted, and when I was asked by others to put the matter

22

in the shape of a resolution, I then did so. The discussion then took a different turn, and every one commenced to speak against it. I am personally convinced that this is the right course, but I recognize that my opinion is not worthy of more consideration than any one else's. Everybody ought to be heard, and the majority ought to decide. We all agree that we try to elevate our profession, though the ways in which we would like to do so may differ. There have been many objections, the principal ones being as to the position taken by the legislatures. That has nothing to do with legislation in the true sense; it will not affect them at all. The idea was to show the different Boards of Pharmacy what the opinion is of those who I believe represent the highest intelligence and the best men of the pharmaceutical profession. If, as many have said, it is not time for such a resolution, let us wait. In New Jersey, we shall go ahead if we find that there are no legal objections, and put the plan in operation.

The seconder of the resolution having consented, Mr. Alpers withdrew the resolution.

Mr. Fennel then moved the following, "That we recommend all reputable teaching colleges of pharmacy to adopt a three years' course in their respective institutions, commencing with the session of 1894."

The motion was seconded.

MR. GOOD: That that is a step in the right direction, I think we shall all concede. Our terms have not been any too long, and are not likely to be. At the same time, I do not think we are ready to pass that resolution now. I would rather not see it passed at this meeting. The resolution recommends that the colleges adopt it at a certain time. I do not believe we are ready to follow it out. There must be a stronger demand for that on the part of colleges before we want to go so far as that. All colleges are now extending their terms. There is room for us to do a great deal of teaching in six or eight months term if necessary. It is only within the last year that we passed a resolution recommending that the colleges should all extend their terms six months. Now, I agree with every word that Professor Simon said in his paper; I could applaud every sentence therein. At the same time, we are not ready to take that step in any positive way, not even so far as recommending it. Let it come naturally, as it will, in the course of a few years. We can do more work than we have been doing in the same terms. It is not so bad a question as we may think it, but it is inexpedient for us to recommend it at this time. I have always felt myself that want of time in college work, but we are not at all likely, I think, to get unanimity in this respect from the colleges, although I am willing to say for the St. Louis college that as soon as the majority favor that course, I will use my influence to that effect.

MR. SHEPPARD: I move to amend by striking out the words "commencing with the session of 1894," and inserting in place thereof "as soon as practicable."

MR. PATCH: I wish to speak against both motion and amendment. From my experience, I believe that we are going a little too fast in these wholesale recommendations as to what should be done—though it would be quite fast enough if it would, by any possible means through the agency of this Section, exert an influence upon the various colleges of pharmacy that will give anything like uniform instruction. Three years' instruction in one college with instruction of four months may mean a great deal less than one year's instruction in another college with a term of nine months. We must remember, too, that pharmacy to-day does not offer a return sufficient for very great additional burden in the way of education. We ask for better men, but pharmacy to-day does not offer inducements for the better men we seek. I would rather see two terms of five months, in which a young man should give all his time to the instruction and not go

into the store. Give him every opportunity for study and every facility for work, and instead of three hours a week in a laboratory, give him twelve, or, if possible, twice that much. As to shortening the time of education, we must remember that one of the greatest experiences in getting an education that comes to the young man is, that he leaves profitable employment and works on half pay for the privilege of attending a college of pharmacy. And we must remember that he often gives his entire leisure to direct attendance upon the school, and yet is not able to study properly, as he has to give to this work but half the time that he ought to give; and I know, too, that so far as the effect of boards of pharmacy is concerned, that in our part of the country it has been a direct injury to education. We find many young men who come into the school solely with the idea of getting, as quickly as possible, barely sufficient information to pass the State Board, and they come to us for that information, and pass the State Boards of the surrounding States, and as soon as they have done that they leave. In some cases, they desire thorough education and graduate, but the work that is being done to-day is not of so good a quality—even with increased facilities and advantages—and as good men are not being turned out, on an average, as when young men came simply because they desired education. I believe we had better go slow in this matter. We are getting ahead of the demand and forcing something there is no use for, and I speak this intelligently; and before we set a limit that has no meaning in it, let us, if possible, devise some plan by which we can get uniform education in the different schools.

MR. FENNEL: I beg to differ with Professor Patch. At the New Orleans meeting, a resolution was adopted, recommending all reputable colleges of pharmacy to increase their course to twenty-six weeks. It has had a very salutary effect. Every reputable college in the United States to-day has a course of twenty-six weeks, with the exception of one, and they went backwards and have a summer course. Why not, after adopting a six-months' term, as we have in all the respectable colleges, increase that term by another year? The course is too short, as you see to-day. If you look over the records of the various institutions and count the number of hours devoted in the institution which gives the greatest number of hours to laboratory work, you will find that every preparation of the Pharmacopœia is to be made in twelve weeks of twelve hours, and it cannot be accomplished in that time. I therefore move that the time be increased to three years.

MR. HALLBERG: I desire to correct the statement of Professor Fennel with reference to the colleges. There are twenty-five out of thirty-six whose terms are from twenty-four weeks up to thirty-two. There are quite a number, however, that have only twenty-week courses, and one has sixteen-week courses, and some of them claim to be reputable.

MR. ECCLES: One of twenty has been raised to thirty-two during the coming year.

MR. HALLBERG: But the effect of the New Orleans resolution is that colleges increase their course to two courses of twenty-six weeks.

THE CHAIRMAN: In regard to the proposition to increase to three years of six months, I would ask, What does time really amount to? Suppose you put it four years of six months each. You may drag out the course in one school, having a few hours given instruction during the week, and cover a certain number of weeks, and say they have complied with this requirement. If you will regulate all the colleges of pharmacy so that they teach a certain number of hours each week, and extend the time, I am with you. To begin with, we have the Michigan school, in which the students are not expected to go into any store at all, but give their entire time to study. The student's lecture hours are in the morning, and in the afternoon he goes into the laboratory at one o'clock, and is supposed to stay there until half past five, or perform a certain amount of

work laid out for him—it is not one or two days in the week, but the whole time, and the term is nine months each. Give a course of six months, and extend it to three years; it would thus be only the equivalent of our two-years' course. Would you then consider our two-years' course on the same basis with the three-years' course of six months required by the schools? Now, what you want is to regulate your course, the amount of work given by an institution, and then afterwards extend your time. I am willing, as one of our own department, to extend our course to three years of nine months. We do this if a student does not come up to our standard after being in the course from three to six months: we tell him he had better arrange his course for three years. In order to get this question into shape, and make a practical recommendation to colleges, we must come up to some standard where we can regulate the amount of work done in each institution during that time.

MR. REMINGTON: I do not believe that the passage of this resolution will do any harm, but that, on the other hand, it will do a great deal of good in the way of influencing the colleges of pharmacy to extend their courses and to give to the young men more time. It may be said that this is not practicable in every case. The colleges themselves will simply have to decide that, so long as they are governed by boards of trustees. These boards will do as they feel in which direction their needs are, and therefore the passage or a resolution of this kind will have no more effect than this, that in the opinion of the Section on Pharmaceutical Education and Legislation of the American Pharmaceutical Association, more time should be given in the various colleges of pharmacy, and that three courses should be adopted if practicable. If that is done, it will have the effect of throwing the influence of this Section in the direction of giving more time to the courses in the colleges of pharmacy. Little matters of detail will have to be left to the individual judgment of the separate boards.

The motion, as amended, was then read by the Secretary, and Mr. Fennel having accepted the amendment, it was put to a vote and unanimously adopted.

Nominations of officers for the ensuing year being next in order, Mr. Hallberg nominated Mr. Eccles for Chairman, and Mr. Whelpley nominated Mr. L. C. Hogan for Secretary.

On motion, the Secretary was instructed to cast the ballot of the Section for the nominees.

The election having taken place, Mr. Stevens, the retiring chairman, introduced Mr. Eccles.

DR. ECCLES: Gentlemen, I thank you, as members of the Association, for the honor you have conferred upon me, in making me chairman of the Section for what I consider will be one of the most important meetings that the Association has ever held. Chicago, during the centennial year, is bound to be visited by many strangers, and the difficulties I foresee that this Section will have to encounter are that every man will want to be absent from the meeting when he ought to be in it, and it will require a great deal of hard work to get quorums together during that time. Members will be coming in and out, and there will be many difficulties to overcome. However, I sincerely hope that all of us will contribute our share towards making the Chicago meeting a great success. I have no hesitation in saying that I shall do the very best in my power toward this end, so that our anticipations may be in no way disappointed when we hold our next great meeting in Chicago.

The Section then adjourned.

# APPENDIX.

## REPORT ON LEGISLATION.

BY L. C. HOGAN, SECRETARY OF THE SECTION ON PHARMACEUTICAL LEGISLATION AND EDUCATION.

Since the last meeting new laws have been enacted in Mississippi and Utah.

Laws and amendments enacted since 1889 and overlooked in report of last year, were passed in New Mexico, British Columbia, Ontario, Minnesota, Florida, Massachusetts, Maine, Georgia, North Carolina, and South Dakota. These will be incorporated in this report so as to bring legislative matters up to date. Efforts will be made to secure new laws this winter in Indiana and Vermont, and amendments making more or less radical changes will be attempted in several states. In the way of Federal legislation the Paddock pure food and drug bill has attracted considerable attention, and been both condemned and approved. We offer no criticism, but append the bill as it passed the Senate and is now pending in the House, so that members may study the same. A bill introduced in the House proposing to restore the stamp tax, we believe to be pure buncombe, and do not think will ever be seriously entertained.

Important Supreme Court decisions have been rendered in California, Iowa, and Michigan, upholding the Constitutionality of Pharmacy laws, also ruling that the conductor of the store must be a registered pharmacist and that a physician not a registered pharmacist can not supply other than his own patients with drugs, medicines and poisons. The full text of the decisions will be found at the end of this report.

Following is the text of the new laws:

### MISSISSIPPI.

*Duty to Obtain License.*—Every person who desires to practice pharmaceutics must obtain a license to do so as hereinafter provided.

*Board of Examiners Created.*—The Board of Pharmaceutical Examiners is hereby created to consist of five practicing pharmacists, who shall be appointed by the Governor, and whose term of office shall expire with that of the Governor appointing them.

*Oath of Examiners.*—Each person appointed as a member of the Board of Pharmaceutical Examiners shall qualify by taking the oath prescribed by the Constitution for

State officers, and shall file a certificate thereof in the office of the Secretary of State within fifteen days of his appointment.

*Organization of Examiners.*—After the members of the Board of Pharmaceutical Examiners have qualified, they shall meet at the capital of the State, in pursuance of a call to be made by the Governor, and organize by electing a president and secretary of the board from among themselves.

*License Upon Examination.*—Every person who desires to practice pharmaceutics must apply, in writing, to the Board of Pharmaceutical Examiners for a license to do so; and, unless exempted by the provisions of this chapter, must appear before the board and be examined by it touching his learning and skill in pharmaceutics, and if he be found to possess sufficient learning and skill therein, and to be of good moral character, the board shall immediately issue to him a license to practice pharmaceutics, which shall be signed by each member of the board who attends the examination and approves of the issuance of the license.

*Examination, When, Where and How Conducted.*—The Board of Pharmaceutical Examiners shall meet at the capital of the State on the first Tuesday in April and October of each year for the purpose of examining applicants for license, and shall remain in session until all applicants for such license have been examined and their examinations, have been approved or disapproved. All examinations, except as to character, shall be upon written questions and answers, and three members of the board are a quorum for business.

*Fee for Examination.*—Applicants for license who are required to be examined touching their learning and skill in pharmaceutics must each pay a fee of $10 to the Board of Pharmaceutical Examiners as a condition precedent to the examination, which fee shall be distributed among the members of the board as their compensation, in such proportion as the board may allow.

*License to Existing Practitioners.*—Each person now engaged in the practice of pharmaceutics in this State is entitled to receive a license therefor, without being examined touching his learning or skill, if he shall apply therefor within six months after this law becomes operative, and shall pay 25 cents for its issuance. If such application be made within the time prescribed and the 25 cents be paid, the Secretary of the Board of Pharmaceutical Examiners shall issue to the applicant a license to practice pharmaceutics which shall be signed in the name of the board by him as secretary.

*Temporary License.*—Any member of the Board of Pharmaceutical Examiners may examine applicants, orally or in writing, and issue a temporary license to them to practice pharmaceutics, which shall authorize such practice and be valid until the next succeeding meeting of the board. But one temporary license shall ever be issued to the same applicant.

*License Must be Recorded.*—Every person who receives a license to practice pharmaceutics must file it for record in the office of the clerk of the circuit court of the county in which he resides, within 30 days after its issuance; and if he fail to do so he shall thereafter be liable for practicing pharmaceutics without license so long as the same shall remain unrecorded. When such license shall be filed the clerk shall record the same in the book in which the licenses of physicians are recorded upon the payment to him of the lawful fee, and when recorded the original shall be delivered on demand of the licensee.

*License in Lieu of One Lost.*—If a license to practice pharmaceutics be issued and become lost or destroyed, the Board of Examiners may issue another in lieu of it, upon satisfactory proof of the loss or destruction.

*Board of Examiners Must Keep a Record of Its Proceedings.*—It is the duty of the Board of Examiners to cause the secretary to keep a complete record of its acts and proceedings, and to preserve all papers, documents and correspondence received by the board and relating to its duties and office.

*Stationery, Blanks, &c.*—Such stationery, blank books and forms as may be needed

by the Board of Pharmaceutical Examiners in the discharge of its duties shall be furnished to it by the Board of Public Contracts.

*Members of Board may be Removed; Vacancies Filled.*—The Governor may remove any, or all, of the members of the Board of Pharmaceutical Examiners, and appoint another, or others, in place of such as may be removed, and may fill by appointment any vacancy that may occur in the board.

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## MINNESOTA.

This law was amended in 1891 to an extent that it practically becomes a new law, and we give the full text as it now stands. The sections amended are so marked.

THE ACT TO REGULATE THE PRACTICE OF PHARMACY, THE LICENSING OF PERSONS TO CARRY ON SUCH PRACTICE, AND THE SALE OF POISONS IN THE STATE OF MINNESOTA (AS AMENDED IN 1891.)

*Be it enacted by the Legislature of the State of Minnesota:*

"SECTION 1. That except as in this act provided, it shall hereafter be unlawful for any person to retail, compound or dispense drugs, medicines or poisons, or to institute or conduct any pharmacy, store or shop for retailing, compounding or dispensing drugs, medicines or poisons, unless such person shall be a registered pharmacist, or shall employ, place and keep in active charge and control of said pharmacy, store or shop, a registered pharmacist, within the full meaning of this act." (As amended in 1891.)

SEC. 2. To be entitled to registration as a pharmacist within the full meaning of this act, the applicant must be a graduate in pharmacy, or a graduate in medicine, within the requirements of this act, or he must be not less than twenty-one (21) years of age, and have had four (4) years' practical experience in drug stores where prescriptions of medical practitioners have been usually compounded, and have sustained a satisfactory examination before the Board of Pharmacy of the State of Minnesota, or he must be at the time of the passage of this act a registered assistant.

Nothing in this section contained shall impair the validity of any registration heretofore granted by said board. But notwithstanding anything in this section hereinbefore contained, any person who was on the 5th day of March, 1885, entitled to registration as a registered pharmacist, and who is at the time of the passage of this act engaged in the business of a dispensing pharmacist in the State of Minnesota, and who shall within thirty (30) days after the passage of this act file with the Secretary of said Board an application for registration, accompanied with his affidavit that he was on the 5th day of March aforesaid, as well as at the time of the passage of this act, so engaged, shall be granted a certificate of registration without examination. (As amended in 1891).

SEC. 3. A graduate in pharmacy or in medicine, must, in order to be so registered, have had four (4) years' practical experience in drug stores where prescriptions of medical practitioners have been usually compounded, and have a diploma from a college or school of pharmacy or medicine, satisfactory to said Board of Pharmacy, as sufficient guarantee of his attainments and proficiency, or he shall be legally entitled to practice medicine in the State of Minnesota. (As amended in 1891.)

SEC. 4. The said Board of Pharmacy may, at their discretion, grant registration and a certificate thereof to any pharmacist licensed or registered by the Board of Pharmacy of any other State, either after or without further examination. It shall be the duty of said Board to grant an assistant's certificate to any person not less than eighteen (18) years of age who shall have had two (2) years' practical experience in drug stores where prescriptions of medical practitioners have been usually compounded, and who shall have passed a satisfactory examination before said Board of Pharmacy of Minnesota; which

certificate shall entitle such person to act only as an assistant to a registered pharmacist personally conducting his own business as such, and shall not entitle such assistant to engage in business on his own account, or as manager, to conduct a drug store, or to transact a pharmacy business for another party. (As amended in 1891).

SEC. 5. Immediately upon the passage of this act, the Minnesota State Pharmaceutical Association shall elect fifteen (15) reputable and practicing pharmacists doing business in the State, from which number the Governor shall appoint five (5). The said five (5) pharmacists, duly elected and appointed, shall constitute the Board of Pharmacy of the State of Minnesota, and shall hold office as respectively designated in their appointments, for the term of one, two, three, four and five years respectively, as hereinafter provided, and until their successors have been duly elected and appointed. The Minnesota State Pharmaceutical Association shall annually thereafter elect five (5) pharmacists, from which number the Governor of the State shall appoint one to fill the vacancy annually occurring in said board. The term of office shall be five years. In case of resignation or removal from the State of any member of said Board, or of a vacancy occurring from any cause, the Governor shall fill the vacancy by appointing a pharmacist from the names last submitted to serve as a member of the Board for the remainder of the term.

SEC. 6. The said Board shall, within sixty (60) days after its appointment, meet and organize by the selection of a President and Secretary from the number of its own members, who shall be elected for the term of one year, and shall perform the duties prescribed by the Board. It shall be the duty of the Board to examine all applications for registration submitted in proper form; to grant certificates of registration to such persons as may be entitled to the same under the provisions of this act; to cause the prosecution of all persons violating its provisions; to report annually to the Governor and to the Minnesota State Pharmaceutical Association, upon the condition of pharmacy in the State, which said report shall also furnish a record of the proceedings of said Board for the year, as well as the names of all pharmacists duly registered under this act. The Board shall hold meetings for the examination of applicants for registration and transaction of such other business as shall pertain to its duties, at least once in three months, and the said Board shall give thirty (30) days' public notice of the time and place of such meeting. The said Board shall also have power to make by-laws for the proper execution of its duties under this act, and shall keep a book of registration, in which shall be entered the names and places of business of all persons registered under this act, which registration book shall also contain such facts as such persons claim to justify their registration. Three members of said Board shall constitute a quorum.

SEC. 7. Every person claiming the right of registration under this act, who shall, within three months after the passage of this act, forward to the Board of Pharmacy satisfactory proof, supported by his affidavit, that he was engaged in the business of dispensing pharmacist on his own account in the State of Minnesota at the time of the passage of this act, as provided in Section 2, shall, upon the payment of the fee hereinafter mentioned, be granted a certificate of registration; provided, that in case of failure or neglect to register as herein specified, then such person shall, in order to be registered, comply with the requirements provided for registration as graduates in pharmacy or licentiates in pharmacy within the meaning of this act.

SEC. 8. Any person engaged in the position of assistant in a pharmacy at the time this act takes effect, not less than eighteen years of age, who shall have had at least three (3) years' practical experience in drug stores where the prescriptions of medical practitioners are compounded, and who shall furnish satisfactory evidence to that effect to the State Board of Pharmacy, shall, upon making application for registration and upon payment to the Secretary of said Board a fee of one dollar within ninety (90) days after this act takes effect, be entitled to a certificate as "registered assistant," which certificate shall

entitle him to continue in such duties as clerk or assistant; but shall not entitle him to engage in business on his own account. Thereafter he shall pay annually to the said Secretary the sum of fifty cents, during the time he shall continue in such duties, in return for which sum he shall receive a renewal of said certificate; *Provided*, any applicant who has had seven years' experience in compounding and dispensing medicines immediately prior to the passage of this act, may receive a certificate of a "registered pharmacist."

SEC. 9. Every person claiming registration as a registered pharmacist under this act shall, before a certificate is granted, pay to the Secretary of the Board of Pharmacy, the sum of two (2) dollars; and every applicant for registration upon examination, whether as a pharmacist or as an assistant, shall pay to said Secretary the sum of five (5) dollars before such examination shall be attempted. Provided, that in case the applicant fails to sustain a satisfactory examination by the said Board, the said five (5) dollars shall be refunded to him. Every certificate hereafter issued under this act shall have plainly written, printed or stamped upon the face thereof the words: "Revocable for the causes specified by law." (As amended in 1891.)

SEC. 10. Every registered pharmacist and every registered assistant who desires to continue the practice of his profession, shall annually during the time he shall continue such practice, on such date as the Board of Pharmacy may prescribe, pay to said Secretary a registration renewal fee, the amount of which shall be fixed by said Board, and shall in no case exceed two (2) dollars for a pharmacist, and one (1) dollar for an assistant; in return for which payment he shall receive a renewal of his registration. (As amended in 1891.)

SEC. 11. The Secretary of the Board of Pharmacy shall receive a salary which shall be determined by said Board: he shall also receive his traveling and other expenses incurred in the performance of his official duties. The other members of said Board shall receive the sum of five dollars for each day actually engaged in such service, and all the legitimate and necessary expenses incurred in attending the meetings of said Board. Said expenses shall be paid from the fees, fines and penalties received by said Board, under the provisions of this act; and no part of the salary or other expenses of said Board shall be paid out of the public treasury. All moneys received by said Board in excess of said allowances and other expenses hereinbefore provided for, shall be held by the Secretary of said Board as a special fund for meeting the expenses of said Board, said Secretary giving such bonds as the said Board shall from time to time direct. The said Board shall, in its annual report to the Governor and to the Minnesota State Pharmaceutical Association, render an account of all moneys received and disbursed by them pursuant to this act. (As amended in 1891.)

SEC. 12. Any person not being, or not having in his employ a registered pharmacist within the full meaning of this act, who shall, after this act shall take effect, retail, compound or dispense drugs, medicines, or poisons, or who shall take, use or exhibit the title of a registered pharmacist, shall for each and every such offense be liable to a penalty of fifty (50) dollars.

Any registered pharmacist or other person who shall permit the compounding or dispensing of prescriptions, or the vending of drugs, medicines or poisons in his store or place of business, except under the supervision of a registered pharmacist or by a registered assistant, and any pharmacist or registered assistant, who, while continuing in business, shall fail or neglect to procure annual registration, and any person who shall willfully make any false representation to procure registration for himself or any other person, or who shall violate any other provision of this act, shall, except as otherwise provided, for each and every such offense be liable to a penalty of fifty (50) dollars.

Except as in this section hereafter provided, drugs, medicines and poisons shall, for all purposes of this act, be construed to include all substances, animal, vegetable or mineral,

commonly kept in stock in drug stores or apothecary shops, and used in compounding medicines or sold for medicinal purposes.

It is provided, however, that nothing in this act shall in any manner interfere with the regular practice of any physician as such, or prevent him as a physician from supplying to his patients such articles as may seem to him proper, or shall interfere with the making or vending of proprietary medicines, or with the sale by general retail dealers of any of the following articles, that is to say: Alum, blue vitriol, borax, carbonate of ammonia, carbonate of soda, castor oil, copperas, Epsom salts, Glauber salts, glycerin, gum arabic, gum camphor, licorice, logwood, rolled sulphur, saltpetre, senna leaves, sublimed sulphur, water of ammonia, or with the sale by such retail dealers of Paris green, kept in stock in sealed packages, and so sold, distinctly labeled "Paris Green, Poison," or shall prevent a shopkeeper whose place of business is more than one mile from a drug store or apothecary shop, from dealing in and selling the commonly used medicines and poisons, if put up for such sale by a registered pharmacist; or interfere with the exclusively wholesale business of any dealers, except as hereinbefore provided. (As amended in 1891.)

SEC. 13. Every proprietor or conductor of a drug store shall be held responsible for the quality of all drugs, chemicals and medicines sold or dispensed by him, except those sold in the original package of the manufacturer, and except those articles or preparations known as patent or proprietary medicines. Any person who shall knowingly, wilfully or fraudulently falsify or adulterate, or cause to be falsified or adulterated, any drug or medical substance, or any preparation authorized or recognized by the Pharmacopœia of the United States, or used or intended to be used in medical practice; or shall mix or cause to be mixed, with any such drug or medicinal substance, any foreign or inert substance whatsoever, for the purpose of destroying or weakening its medicinal power and effect, or of lessening its cost, and shall wilfully, knowingly or fraudulently, sell or cause the same to be sold for medicinal purposes, shall be deemed guilty of a misdemeanor, and upon conviction thereof shall pay a fine not exceeding five hundred dollars, and shall forfeit to the State of Minnesota all articles so adulterated, "and any person so convicted, may also, at the discretion of the court before which conviction occurs, be further adjudged and sentenced to forfeit his registration and the certificate thereof." (As amended in 1891.)

SEC. 14. No person shall sell at retail any poisons commonly recognized as such, and especially aconite, arsenic, belladonna, biniodide of mercury, carbolic acid, chloral hydrate, chloroform, conium, corrosive sublimate, creasote, croton oil, cyanide of potassium, digitalis, hydrocyanic acid, laudanum, morphine, nux vomica, oil of bitter almonds, oil tansy, opium, oxalic acid, strychnine, sugar of lead, sulphate of zinc, white precipitate, red precipitate, without affixing to the box, bottle, vessel, or package containing the same, and to the wrapper or cover thereof, a label bearing the name "POISON" distinctly shown, together with the name and place of business of the seller. Nor shall he deliver any of the said poison to any person without satisfying himself that such poison is to be used for legitimate purposes: provided, that nothing herein contained shall apply to the dispensing of physicians' prescriptions specifying any of the poisons aforesaid.

"Every person omitting to comply with any requirement of this section shall be deemed guilty of a misdemeanor, and shall, upon conviction thereof, pay a fine not less than five (5) dollars for each such omission." (As amended in 1891.)

SEC. 15. All suits for the recovery of the several penalties prescribed in this act shall be prosecuted in the name of the State of Minnesota, in any court having jurisdiction; and it shall be the duty of the county attorney of the county wherein such offense is committed, to prosecute all persons violating the provisions of this act, upon proper complaint being made.

If in any such case the county attorney omit or refuse to act, the Board may employ some other attorney for such purpose.

Costs and disbursements shall be adjudged in favor of the State whenever it recovers judgment in such suit. All fines and penalties paid or collected under the provisions of this act shall inure one-half to the Board of Pharmacy, and the remainder to the school fund of the county in which the conviction was had or the judgment obtained. If any person adjudged liable to any penalty or penalties imposed by this act shall not pay the judgment therefor within sixty (60) days after the rendition thereof, or, in case of appeal, within thirty (30) days after the affirmation of such judgment, his registration and certificate thereof may be by the Board of Pharmacy summarily revoked and cancelled, and such person shall not be entitled to registration within one year thence next to ensue or without paying such judgment in full. (As amended in 1891.)

SEC. 16. All acts or portions of acts regulating the practice of pharmacy and the sale of poisons, or the adulteration of drugs, within this State, enacted prior to the passage of this act, are hereby repealed; provided, that nothing in this act shall be so construed as to prevent any person who has once been a registered member, and may have forfeited his membership by non-payment of dues or fees, from renewing his membership within two years, by paying the required dues or fees, without examination.

SEC. 17. All persons registered under this act, shall be exempt from jury duty in the State of Minnesota.

SEC. 18. Every person receiving a certificate under this act shall keep the same conspicuously exposed in his place of business. Every registered pharmacist or registered assistant shall, within ten (10) days after changing his place of business or employment, notify the Secretary of the Board of his new place of business; he shall thereupon be entitled to receive from the Secretary a notice in writing that his address has been changed on the book of registration. Without such notice from said Secretary, such pharmacist or assistant shall not act as such longer than ten (10) days after his aforesaid notice of change.

Any person violating the provisions of this section shall be deemed guilty of a misdemeanor, and upon conviction thereof shall be punished by a fine of ten (10) dollars, and the costs of prosecution.

SEC. 19. Any registration obtained by false representation shall be void, and the Board of Pharmacy may, after hearing complaint and evidence, revoke any certificate which it may determine to have been so obtained.

SEC. 20. The Board may hereafter appoint a Secretary who is not a member of the Board.

(Sections 18, 19, 20 added in 1891.)

SEC. 21. This act shall take effect and be in force from and after its passage. (No changes in 1891 from 18 to 21).

*Sec. 15 of Amendatory Act of 1891.*

SEC. 15. This act shall take effect and be in force from and after November 1st, A. D. 1891.

Approved April 17, A. D. 1891.

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## NEW MEXICO.

### AN ACT REGULATING THE SALE OF DRUGS, MEDICINES AND POISONS.

*Be it enacted by the Legislative Assembly of the Territory of New Mexico:*

SECTION 1. That from and after the passage of this act, it shall be unlawful for any person, not a registered pharmacist within the meaning of this act, to conduct any drug store, pharmacy, apothecary shop or store for the purpose of retailing, compounding or dispensing medicines in the Territory of New Mexico, except as hereinafter provided.

SEC. 2. That it shall be unlawful for the proprietor of any such store or pharmacy to

allow any person, except a registered pharmacist, to compound or dispense the prescriptions of physicians, except as an aid to, and under the supervision of a registered pharmacist.

Any person violating the provisions of this section shall be deemed guilty of a misdemeanor, and on conviction shall be liable to a fine of not less than five, nor more than one hundred dollars.

SEC. 3. The governor shall appoint five persons, all of whom shall have been residents of the territory for three (3) or more years and of at least eight (8) years' practical experience as druggists or pharmacists, who shall be known and styled "the Board of Pharmacy" for the Territory of New Mexico, one of whom shall hold the office for five (5) years; one for four (4) years; one for three (3) years; one for two (2) years; one for one (1) year in the first instance; and thereafter, the governor shall annually appoint one (1) person, to serve as a member of the Board for five (5) years. The persons so appointed shall constitute the Board of Pharmacy, and shall hold the office for the term for which they were appointed, or until their successors are duly appointed and qualified. They, the said Board, and each of them, shall within ten (10) days after their appointment, or being apprised of the same, take and subscribe the usual official oath, before a properly qualified officer of the county in which they reside. The said Board shall organize within thirty (30) days from and after their appointment, and anually thereafter, by the election of a President and Secretary. A majority of the Board shall constitute a quorum for the transaction of business. Said Board shall have the power to make by-laws and all necessary regulations for the proper fulfillment of their duties under this act, without expense to the territory. Any vacancy occurring in said Board, shall be filled by an appointment by the Governor, for the unexpired term.

SEC. 4. The Board of Pharmacy shall register in a suitable book, a duplicate of which shall be kept in the office of the Secretary of the Territory, the names and places of residence of all persons to whom they issue certificates, and the dates thereof.

It shall be the duty of said Board of Pharmacy to register, without examination, as registered pharmacists, all druggists and pharmacists who are engaged in business in the Territory of New Mexico at the passage of this act, as owners, principals or clerks of stores for retailing, compounding or dispensing drugs, medicines or chemicals for medicinal use, or for compounding and dispensing physicians' prescriptions; provided, no druggist's clerk shall be so registered unless he be eighteen (18) years of age and has been engaged in some store or pharmacy where physicians' prescriptions were compounded and dispensed, for the space of three (3) years next preceding the passage of this act.

In case of the failure or neglect of any person to apply for registration within sixty (60) days after the organization of the said Board of Pharmacy, he shall have forfeited the privilege of registering without examination, and shall only be registered after examination, as set forth in section 5 of this act.

SEC. 5. That the said Board of Pharmacy shall, upon application, and at such time and place and in such manner as they may determine, examine each and every person who shall desire to conduct the business of selling at retail, compounding or dispensing, drugs, medicines or chemicals for medical use, or compounding or dispensing physicians' prescriptions as pharmacists in the Territory of New Mexico; and if a majority of said Board shall be satisfied that said person is competent and fully qualified to conduct said business of compounding or dispensing drugs, medicines or chemicals, for medical use, or to compound and dispense physicians' prescriptions, they shall enter the name of such person, as a registered pharmacist, in the book provided for in section 4 of this act; provided, that all graduates in pharmacy having a diploma from an incorporated college or school of pharmacy, that requires a practical experience in pharmacy of not less than three (3) years before granting a diploma may, in the discretion of the Board be enti-

tled to have their names registered as registered pharmacists by said Board, without examination.

The Board of Pharmacy shall issue an appropriate certificate to each person registered, which certificate must be conspicuously displayed in every store or place described in this section. Said certificate must be renewed twelve (12) months after each date of issue.

SEC. 6. The Board of Pharmacy shall be entitled to demand and receive from each person whom they register and furnish a certificate as a registered pharmacist, without examination, the sum of two dollars, and for each and every person whom they examine, the sum of five dollars, which shall be in full for all services. In case the examination of said person shall prove defective and unsatisfactory to the Board, and he be declined registration, he shall be permitted to present himself for re-examination within twelve (12) months thereafter, and no charge shall be made for such examination.

SEC. 7. The Board of Pharmacy shall hold quarterly sessions per annum at such times and places as the Board may determine; other sessions of the Board may also be held whenever and wherever a quorum of the Board is present.

In the interim of the sessions of the Board, and upon satisfactory evidence of fitness of an applicant, any one (1) member of the Board may, in his discretion, issue a temporary certificate, which shall authorize and empower the holder to conduct a drug store or pharmacy, as set forth in section 5 of this act. Such temporary certificate must be signed by one (1) member, and shall expire and terminate at the date of the next succeeding quarterly session of the Board after the granting thereof. No fee shall be demanded for this temporary certificate.

SEC. 8. Every owner of a drug store in the Territory of New Mexico shall be held responsible for the quality of all drugs, chemicals and medicines he may sell or dispense, with the exceptions of those sold in the original packages of the manufacturer or wholesale dealer, and also those known as proprietary medicines. And should he knowingly, intentionally and fraudulently adulterate, or cause to be adulterated, such drugs, chemicals or medical preparations, he shall be deemed guilty of a misdemeanor, and upon conviction thereof, his license as a registered pharmacist shall be thereby revoked, and in addition thereto, be liable to a penalty not exceeding five hundred ($500) dollars.

SEC. 9. Any person who shall procure or attempt to procure registration for himself or for another under this act by making or causing to be made, false representations, shall be deemed guilty of a misdemeanor, and shall, upon conviction thereof, be liable to a penalty of not less than five and not exceeding one hundred dollars, and his name, together with the name of the person so falsely registered, shall be stricken from the register.

SEC. 10. Any person not a registered pharmacist, as provided in this act, who shall conduct a store or pharmacy, or place for retailing, compounding or dispensing drugs, medicines or chemicals, for medical use, or for compounding or dispensing physicians' prescriptions in the Territory of New Mexico, or who shall take, use, or exhibit the title of "registered pharmacist," shall be deemed guilty of a misdemeanor, and upon conviction thereof, be liable to a penalty of not less than five nor more than one hundred dollars; provided, that any person or persons not a registered pharmacist may own and conduct such store if he or they keep constantly in their employ a registered pharmacist; provided further, this act shall not apply to physicians putting up their own prescriptions, nor to the sale of patent or proprietary medicines, nor to the sale of those articles commonly known as "grocers' drugs," except those articles that are denominated "poisons" under the law known as the "New Mexico poison law."

SEC. 11. If any registered pharmacist shall go out of the drug business, and remain out for a period of twelve (12) months, his certificate as registered pharmacist shall thereupon expire.

SEC. 12. All suits for the recovery of the several penalties prescribed in this act, shall be prosecuted in the name of "The Territory of New Mexico," in any court having jurisdiction; and it shall be the duty of the prosecuting attorney of the county where such offense is committed, to prosecute all persons violating the provisions of this act, upon proper complaint being made. All penalties collected under the provisions of this act, shall inure to the expense fund of the Board which may occur.

SEC. 13. All persons registered under this act shall be exempt and free from all jury duty in the Territory of New Mexico, upon such person making affidavit that there is no other drug store in the town except theirs, and that they have no proper assistant and can procure no such assistant to attend to their business during their absence.

SEC. 14. It shall be the duty of the said Board to grant to persons or merchants in towns or camps having no drug store, minor certificates without charge as they may deem proper, to vend such medicines, compounds or chemicals as are required by the general public; provided, that this law is not to be so construed as to prevent ranchmen or miners not within reach of a store or place where drugs are sold, from dispensing medicines to their families or employés; provided further, that it shall be the duty of the Secretary of said Board to render an accurate annual statement to the governor of the territory of all moneys received and expended by said Board during each year, and he shall also report upon the general condition of pharmacy throughout the territory.

SEC. 15. All acts and parts of acts in conflict with this act, be, and the same are hereby repealed. This act shall be in force and take effect from and after its passage.

Approved, Feb. 15, 1889.

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## UTAH PHARMACY LAW.

### CHAPTER XXXV.

### AN ACT REGULATING THE PRACTICE OF PHARMACY.

*Be it enacted by the Governor and Legislative Assembly of the Territory of Utah:*

SECTION 1. That it shall not be lawful for any person other than a registered pharmacist, to compound or dispense drugs, medicines or poisons, or to open and conduct any pharmacy for compounding or dispensing drugs, medicines or poisons, unless such persons shall be, or shall employ and place in charge of said pharmacy or store, a registered pharmacist, within the meaning of this act, except as hereinafter provided.

SEC. 2. Any person shall be entitled to be registered as a registered pharmacist within the meaning of this act, who shall be a licentiate in pharmacy, or shall furnish evidence to the Territorial Board of Pharmacy, hereinafter mentioned, that he has had four years' practical experience in compounding drugs in a store or pharmacy, where the prescriptions of medical practitioners are compounded. The said Board shall have the right to refuse registration to applicants whose examination or credentials are not satisfactory evidence of their competency. This provision shall also apply to the registration of assistant pharmacists hereinafter mentioned.

SEC. 3. Graduates in pharmacy who have obtained diplomas from such colleges or schools of pharmacy as shall be approved of by the Board of Pharmacy, and who previous to obtaining said diplomas have had three years' practical experience in a drug store where physicians' prescriptions are compounded and dispensed, may, on payment of a fee hereinafter provided, be made registered pharmacists.

SEC. 4. Licentiates in pharmacy shall be such persons as have had four years' practical experience in drug stores wherein prescriptions of medical practitioners are compounded, and are not less than eighteen years of age, and have sustained a satisfactory examination before the Territorial Board of Pharmacy; and shall be granted a certificate accordingly, upon the payment of a fee hereinafter named.

SEC. 5. It shall be the duty of the said Board of Pharmacy to grant an assistant's cer-

tificate to such persons as have had two years' practical experience in drug stores where prescriptions of medical practitioners are compounded, and have passed a satisfactory examination before said Board of Pharmacy; the holder of said certificate shall have the right to act as clerk or salesman during the temporary absence of the owner or manager thereof.

SEC. 6. Immediately upon the passage of this act, the Governor of the Territory of Utah shall, by and with the consent of the Legislative Council, appoint five (5) persons from among such competent pharmacists that have had five years' practical experience in the capacity of dispensing pharmacists, selecting not more than two members from any one city, and the said five pharmacists shall constitute the Board of Pharmacy. The persons so appointed shall hold their offices for five years, provided that the term of office of the five first appointed shall be so arranged that the term of one shall expire on a given day of each year, and the vacancies so created, as well as all other vacancies otherwise occurring, shall be refilled by the Governor.

SEC. 7. The said Board shall within thirty days of its appointment, meet and organize by electing a President and Secretary from among their members. It shall be the duty of the Board to examine all applications for registration submitted in proper form; to grant certificates of registration to such persons as may be entitled to the same under the provisions of this act; to cause the prosecution of all persons violating its provisions; to report annually to the Governor the condition of pharmacy in this Territory, which said report shall also furnish a record of the proceedings of the said Board for the year and account for all moneys received and disbursed pursuant to this act, and also the names of all pharmacists duly registered under this act. The Board shall hold meetings for examination of applicants for registration, and the transaction of such other business as shall pertain to its duties, at least once in three months, and it shall give at least thirty days' public notice of the time of such meetings; shall have power to make by-laws for the proper fulfillment of its duties under this act, and shall keep a book of registration in which shall be entered the names and places of business of all persons registered under this act, which book shall also specify such facts as said person shall claim to justify their registration. Three members of said Board shall constitute a quorum.

SEC. 8. Every person applying for registration as registered licentiate or assistant pharmacist, shall, before a certificate be granted, pay to the Secretary of the Board the sum of three dollars, and by every applicant for registration by examination shall be paid the sum of five dollars. *Provided*, That in case of the failure of any applicant to pass a satisfactory examination, his or her money shall be refunded.

SEC. 9. Every registered pharmacist who desires to continue the practice of his profession, shall biennially thereafter during the time he shall continue in such practice, on such date as the Board of Pharmacy may determine, of which date he shall have thirty days' notice by said Board, pay to the Secretary of the Board a registration fee, to be fixed by the Board, but which shall in no case exceed two dollars, for which he shall receive a renewal of said registration. The failure of any registered pharmacist to pay said fee shall not deprive him of his right to renewal upon payment thereof; nor shall his retirement from the profession deprive him of his right to renew his registration, should he at any time thereafter wish to resume the practice, upon the payment of said fee. Registered assistants upon receiving notice as aforesaid, shall, if they desire to renew their registration, pay to the Secretary of said Board a biennial fee of one dollar. Every certificate of registration granted under this act shall be conspicuously exposed in the pharmacy to which it applies.

SEC. 10. The Secretary of the Board of Pharmacy shall receive a salary, which shall be determined by said Board. He shall also receive his traveling and other expenses incurred in the performance of his official duty. The other members of said Board shall receive the sum of five dollars for each day actually engaged in such service, and all

legitimate and necessary expenses incurred in attending the meeting of said Board; *Provided*, That no part of the salaries or expenses of the said Board shall be paid out of the Territorial treasury. All moneys received in excess of these expenditures shall be held by the Secretary of said Board, as a special fund for meeting future expenses of the Board, said Secretary giving such bonds as the Board shall from time to time direct.

SEC. 11. Any person who is not a registered pharmacist nor licentiate in pharmacy, duly authorized under this act to do business on his own account, who shall after the expiration of three months from the passage of this act, keep a pharmacy, store or shop for the dispensing and compounding of physicians' prescriptions, and shall not have in his employ in said pharmacy, store or shop, a registered pharmacist, nor licentiate in pharmacy, authorized by the Territorial Board to manage a pharmacy, shall for each and every offense be liable to a fine of two hundred and fifty dollars.

SEC. 12. Any person not registered under this act who shall take, use or exhibit the title of registered pharmacist, or licentiate in pharmacy, shall be liable to a fine of one hundred dollars for each and every such offense; a like penalty shall attach to a licentiate in pharmacy who shall without authority, take, use or exhibit the title of "registered pharmacist" in the Territory of Utah.

SEC. 13. Any proprietor of a pharmacy, or the person who shall permit the compounding or dispensing of physicians' prescriptions except by a registered pharmacist or licentiate in pharmacy, or under the immediate supervision of one, or who, while continuing in the pursuit of pharmacy in the Territory of Utah, shall fail or neglect to procure his biennial registration, and any person who shall wilfully make any false representation to procure for himself or for another, registration, or shall violate any other provision of this act, shall for each and every offense be liable to a penalty of one hundred dollars; *Provided*, That nothing in this act shall in any manner interfere with the business of any physician in regular practice, or prevent him from supplying to his patients such articles as may to him seem proper; nor with the business of any dealers except as hereinafter provided; *Provided*, also, that nothing in this act shall in any manner interfere with the business of merchants to sell or vend all such medicines and pharmaceutical preparations as are required by the general public, and bearing the name of the manufacturer.

SEC. 14. The proprietors of all pharmacies shall be held responsible for the quality of all drugs and chemicals sold or dispensed at their respective places of business, except patent and proprietary preparations, and articles sold in the original packages of the manufacturer. Any person who shall wilfully adulterate or alter, or cause, or permit to be adulterated or altered, any drug, medicine or pharmaceutical preparation, or shall sell or offer for sale any such adulterated or altered article, and any person who shall substitute one material for another, with the intention to defraud or deceive the purchaser, shall be guilty of a misdemeanor, and liable for prosecution therefor. If convicted, he shall pay a fine in any sum less than three hundred dollars for each and every such offense, beside all the cost incurred in investigation and trial. All suits for the recovery of the several penalties prescribed by this act, shall be prosecuted in the name of the people of the Territory of Utah in any court of competent jurisdiction; and it shall be the duty of the district attorney where such offense is committed, to prosecute all persons violating any of the provisions of this act, upon proper complaint being made. All penalties collected for such violation shall be paid to the said Board of Pharmacy, to be held by said Board as heretofore directed.

SEC. 15. No person shall sell any poisons commonly recognized as such, and especially aconite, arsenic, belladonna, biniodide of mercury, carbolic acid, chloral hydrate, chloroform, conium, corrosive sublimate, creosote, croton oil, cyanide of potassium, digitalis, hydrocyanic acid, laudanum, morphine, nux vomica, oil of bitter almond, opium, oxalic acid, strychnine, sugar of lead, sulphate of zinc, white precipitate, red precipitate,

without affixing to the box, vessel or package containing the same, and to the wrapper or cover thereof, a red label bearing the name of the article, and the word "poison" distinctly shown, with the name and place of business of the seller, who shall not deliver any of said poisons without satisfying himself that said poisons are to be used for legitimate purpose; *Provided*, That nothing herein contained shall apply to the dispensing of physicians' prescriptions of any of the poisons or articles aforesaid. Any person failing to comply with the requirements of this section shall be liable to a fine in any sum less than three hundred dollars for each and every such offense.

SEC. 16. All acts or portions of acts regulating the practice of pharmacy and the sale of poisons within this Territory, enacted prior to the passage of this act, are hereby repealed.

Approved March 10, 1892.

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## SOUTH DAKOTA.

### AN ACT TO REGULATE THE PRACTICE OF PHARMACY IN THE STATE OF SOUTH DAKOTA, AND TO ESTABLISH THE SOUTH DAKOTA STATE PHARMACEUTICAL ASSOCIATION.

*Be it Enacted by the Legislature of the State of South Dakota:*

SECTION 1. That it shall hereafter be unlawful for any person, other than a registered pharmacist, to retail, compound or dispense drugs, medicines or poisons, or to open or conduct any pharmacy or store for retailing, compounding or dispensing drugs, medicines or poisons, unless such person shall be a registered pharmacist within the meaning of this act, except as herein provided.

SEC. 2. Any person of good moral character and temperate habits, shall be entitled to be registered as a pharmacist within the meaning of this act, who shall be a licentiate in pharmacy, or who shall be a graduate in pharmacy from a reputable college of pharmacy, whose course of study and requirements are approved by the Board of Pharmaceutical Examiners hereinafter provided for, or who shall hold a certificate of registration from the South Dakota Board of Pharmacy at the time this act takes effect, or who was engaged in the practice of pharmacy in the Territory of Dakota prior to the organization of the present Board of Pharmacy. Provided, that they are now, and have been continuously, engaged in said practice.

SEC. 3. Licentiates in pharmacy shall be such persons not less than eighteen years of age who have had three years' experience in compounding drugs in drug stores wherein the prescriptions of medical practitioners are compounded, and have passed a satisfactory examination before the State Board of Pharmacy herein mentioned. The said Board may, in their discretion, grant certificates of registration to such persons as shall furnish with their application satisfactory proof that they have been registered by examination in some other State, provided, that such other State shall require a degree of competency equal to that required of applicants in this State.

SEC. 4. The registered pharmacists herein provided are hereby constituted an Association under the name and title of the "South Dakota State Pharmaceutical Association," the purposes of which shall be to improve the science and art of pharmacy, and to restrict the sale of medicines to regularly educated and qualified persons, as provided in this act. The South Dakota State Pharmaceutical Association shall report annually, directly to the Governor, recommending the first year the names of at least nine persons whom said Association shall deem best qualified to serve as members of the Board of Pharmacy; and the names of at least three members each year thereafter. Provided, That said Association shall, at its first annual meeting after this act takes effect, which shall be held at Watertown, South Dakota, August 20th, 1890, divide the State into three pharmaceutical districts, and the nominees shall be three from each district the first year,

and three from the district in which the annual vacancy occurs each year thereafter. The Governor shall appoint, on or before the first day of October, 1890, from among the members recommended by said Association, one person from each pharmaceutical district herein provided, and the persons so appointed shall constitute the State Board of Pharmaceutical Examiners for South Dakota, and shall hold office for the term of three years, or until their successors are appointed and qualified. Provided, That each member of said Board shall be a practicing pharmacist, doing a retail drug business in South Dakota; and provided further, That the term of office of the three first appointed shall be so arranged that one shall expire on the thirtieth day of September of each year, and the vacancy so created, as well as all other vacancies, shall be filled by the Governor from the nominees last submitted residing in the district where such vacancy occurs.

SEC. 5. The said Board shall within thirty days after its appointment meet and organize by electing one of their members president. The Secretary and Treasurer of the South Dakota State Pharmaceutical Association shall each respectively be Secretary and Treasurer of the Board, and they shall each give such bonds as the Association may require. The secretary shall pay over to the treasurer all moneys that shall come into his hands as such secretary, and the treasurer shall disburse the same only on the order of the President of the Association, countersigned by the Secretary. It shall be the duty of the Board to examine all applications for registration submitted in due form as provided in the rules and regulations of the Board; to grant certificates of registration to such persons as may be entitled to the same under the provisions of this act; to cause the prosecution of all persons violating its provisions, provided that complaint under oath has been filed with the Secretary of the Board. It shall be the duty of the Secretary to notify the member of the Board in whose district the alleged violation shall have occurred, whose duty shall be to cause the prosecution of the offender in the name of the State of South Dakota. Provided further: That if, upon investigation, in the judgment of said member, the charges preferred cannot be sustained, he shall report the case to the other members of the Board, and if a majority of the Board shall then agree that prosecution is not warranted, the case may be dropped; otherwise the said member shall cause the prosecution to be made as aforesaid.

SEC. 6. The Board shall hold meetings for the examination of applicants for registration, and the transaction of such other business as shall pertain to its duties at such times and places as the South Dakota State Pharmaceutical Association may direct. Provided: That special meetings of the Board may be held whenever it shall be deemed necessary by a majority of the members thereof. It shall be the duty of the Board to report annually to the Governor and to the South Dakota State Pharmaceutical Association upon the condition of pharmacy in this State, which said report shall also furnish a record of the proceedings of the said Board for the year, and also the names of all the pharmacists duly registered under this act. Said Board shall have power to make by-laws and regulations for the proper fulfillment of its duties under this act, and shall keep a book of registration in which shall be entered the names and places of business of all persons registered under this act, which book shall also specify such facts as such persons shall claim to justify their registration. Two members of said Board shall constitute a quorum.

SEC. 7. Any person shall be entitled to registration as assistant pharmacist who is of the age of eighteen years, of good moral character, temperate habits, and has had two years' service under a registered pharmacist, and shall pass an examination before the State Board of Pharmacy that shall show competency, or qualification equal to such service, or who shall hold a certificate of registration as such assistant from the South Dakota Board of Pharmacy at the time this act takes effect. Any registered assistant pharmacist shall have the right to compound medicines or sell poisons under the direct supervision of a registered pharmacist, and he may take charge of a drug store or phar-

macy during the temporary absence of the owner or manager thereof. Provided, That nothing herein shall be construed as giving such assistant authority to continuously perform any of the duties herein mentioned except under the supervision and in the presence of the manager.

SEC. 8. Every person applying for registration as a registered pharmacist shall, before a certificate is granted, pay to the Secretary of the Board the sum of Two Dollars, and a like sum shall be paid by applicants for registration as assistant pharmacists; and every applicant for registration by examination shall pay to the Secretary the sum of Two Dollars with his application, and before receiving his certificate of registration an additional sum of Three Dollars.

SEC. 9. Every registered pharmacist who desires to continue the practice of his profession shall annually thereafter, during the time he shall continue in such practice, on such date as the South Dakota State Pharmaceutical Association may determine, pay to the Secretary of the Board an annual registry fee to be fixed by the Association, but which in no case shall exceed the sum of $5, for which he shall receive a renewal of said registration. The failure of any registered pharmacist to pay said fee shall not deprive him of the right to renewal upon payment thereof, nor shall his retirement from the profession deprive him of the right to renew his registration should he wish to resume the practice. Registered assistants who desire to renew their registration shall pay for such renewal fifty cents per annum. Every certificate of registration granted under this act shall be conspicuously exposed in the pharmacy to which it applies.

SEC. 10. The Secretary of the Board shall receive a salary which shall be fixed by the Association, and which shall not exceed the sum of five hundred dollars per year. He shall also receive his traveling and other necessary expenses incurred in the performance of his official duties. The members of the Board shall receive the sum of five dollars for each day actually engaged in its service, and all legitimate and necessary expenses incurred in attending the meetings of said Board. Said expenses shall be paid from the fees and penalties received by the Association under the provisions of this act; and no part of the salary or other expenses of the Board shall be paid out of the State treasury. All moneys received in excess of said per diem allowance, and other expenses above provided for, shall be held by the Treasurer of the Association as a special fund for paying the cost of publishing an annual report of the proceedings of the Board and Association, and other necessary expenses.

SEC. 11. Any person not being a registered pharmacist within the meaning of this act, who shall, thirty days after this act takes effect, keep a pharmacy or store for retailing or compounding medicines, or who shall take, use or exhibit the title of a registered pharmacist, shall be deemed guilty of a misdemeanor, and for each and every offense be liable to a penalty of fifty dollars, upon conviction thereof. Any registered pharmacist who shall permit the compounding or dispensing of prescriptions or the vending of drugs or poisons in his store or place of business, except under the supervision of a registered pharmacist, or except by a registered assistant pharmacist, as herein provided, or any pharmacist or assistant who, while continuing in business, shall fail or neglect to procure his annual registration, or any person who shall wilfully make any false representations to procure registration for himself or any other person, shall be deemed guilty of a misdemeanor and liable to a penalty of fifty dollars, upon conviction thereof, provided that nothing in this act shall apply to, nor in any manner interfere, with the business of any physician, or prevent him from supplying to his patients such articles as may seem to him proper. And provided further, That no part of this section shall be construed as to give the right to any physician to furnish any intoxicating liquors to be used as a beverage, on prescription or otherwise.

SEC. 12. No person shall add to or remove from any drug, medicine, chemical or pharmaceutical preparation any ingredient or material for the purpose of adulteration or sub-

stitution, which will alter the nature or composition of such drugs or other preparation. Any person who shall thus wilfully adulterate or alter, or shall sell or offer for sale any such adulterated or altered preparation, or cause to be substituted one material for another with the intention to defraud or deceive the purchaser, shall be deemed guilty of a misdemeanor, and be liable to prosecution under this act. If convicted he shall be liable to all the costs of the action, and all the expenses of the Board of Pharmacy in connection therewith, and for each and every offense shall be liable to a fine of fifty dollars.

SEC. 13. Every person who shall sell arsenic, carbolic acid, nitric acid, sulphuric acid, belladonna, aconite, opium, and their preparations [except paregoric and Dover's powder], strychnine, corrosive sublimate, prussic acid, cyanide of potassium, Paris green or other poisons liable to be fatal to adult human life in doses of fifteen grains or less, shall affix to the package sold by him, a label, plainly maked with his name, place of business and the word "Poison," together with the antidote therefor, and shall enter in a book kept by him for that purpose the name of the purchaser, the name, quantity and kind of poison sold, and such book shall be kept open for public inspection, and be preserved for reference for at least two years, provided that nothing herein contianed shall apply to the dispensing of physicians' prescriptions specifying poisons; and all other poisons which are liable to be destructive to adult human life, in quantities of sixty grains or less, shall, before they are delivered to the purchaser, be plainly labeled with the word "Poison." Any person failing to comply with the requirements of this section shall be deemed guilty of a misdemeanor, and upon conviction thereof, shall be fined ten dollars for each and every such omission.

SEC. 14. Any member of the Board of Pharmacy, or officer herein provided for, who shall wilfully neglect any of the duties provided in this act, or who shall aid or abet any person in the evasion or violation of this act, shall be deemed guilty of a misdemeanor, and upon conviction thereof, shall be liable to a penalty of fifty dollars for each and every such offence.

SEC. 15. All suits for the recovery of the several penalties prescribed in this act shall be prosecuted in the name of the people of the State of South Dakota in any court having jurisdiction therein, and it shall be the duty of the State's attorney of the county where such offense is committed to prosecute all persons violating the provisions of this act, upon complaint being made. All penalties collected under the provisions of this act shall inure to the South Dakota State Pharmaceutical Association.

SEC. 16. All acts or parts of acts regulating the practice of pharmacy within this State enacted previous to the passage of this act, which in any manner conflict with the provisions of this act, are hereby repealed.

SEC. 17. This act shall take effect and be in force after its passage and approval as provided in Art. 3, Sec. 22, of the State Constitution.

Approved, March 8th, 1890. A. C. MELLETTE, *Governor.*

UNITED STATES OF AMERICA, } Secretary's Office.
STATE OF SOUTH DAKOTA. }

I, A. O. Ringsrud, Secretary of State of the State of South Dakota, do hereby certify that I have carefully compared the foregoing copy of An Act to Regulate the Practice of Pharmacy in the State of South Dakota, and to establish the South Dakota Pharmaceutical Association, with the original now on file in this office, and that the same is a correct transcript therefrom, and of the whole thereof.

In testimony whereof, I have hereunto set my hand and affixed the great seal of the State of South Dakota, at Pierre, this 1st day of April, 1890.

A. O. RINGSRUD, *Secretary of State.*

## BRITISH COLUMBIA.

### An Act to establish a Pharmaceutical Association in the Province of British Columbia.

Whereas it is expedient for the benefit of the public that there should, by enactment, be established a certain standard of qualification required by those persons engaging in the profession of Pharmacy:

Therefore, Her Majesty, by and with the advice and consent of the Legislative Assembly of the Province of British Columbia, enacts as follows:—

1. This Act shall be cited as the "Pharmacy Act, 1891."

2. There is hereby established, within and for the Province of British Columbia, an association which shall be known as "The Pharmaceutical Association of British Columbia."

3. The Association is hereby incorporated under the name and style of "The Pharmaceutical Association of the Province of British Columbia," and the said Association shall be deemed to be a body politic and corporate, with power to acquire, hold, and dispose of such real and personal property as may be necessary for the purposes and benefits of the Association, and to sue and be sued; and every person who may be registered hereafter under the provisions of this act shall be a member of the said Association.

4. The affairs of the Association shall be conducted by a Council composed of six licentiates of Pharmacy, members of this Association resident in this Province, three of whom retire annually, according to seniority, eligible for re-election. Four members shall constitute a quorum.

5. This Council shall be elected as the by-laws of the Association may direct.

6. The first Council shall be appointed by the Lieutenant-Governor in Council, three to serve for one year, and three for two years, and shall continue in office until their successors are elected.

7. The Council of the Association has power—

(*a*) To frame such by-laws for the said Association as they shall deem proper and necessary for the purposes contemplated by this act, to alter and amend such by-laws from time to time, and to repeal the same in whole or in part, and substitute others therefor, subject to the approval of a majority of the members of the Association, one month's notice having been previously given to the members of this Association to that effect: provided always that such by-laws shall be subject to the approval of the Lieutenant-Governor in Council.

(*b*) To elect at their first meeting subsequent to the annual elections, from among their members, a president and a vice-president, also a secretary-treasurer, who shall act as registrar, he to be appointed from among the members of the Association:

(*c*) To elect persons to replace members of the Council who die, resign, or are removed; such persons must be chosen from among the members of the Association:

(*d*) To elect as honorary and corresponding members of the Association such persons as may be eminent for their scientific attainments. Such honorary members shall not, as such, be entitled to vote at elections, or to rank as licentiates of Pharmacy:

(*e*) To sell, mortgage, control, and manage the real and personal property of the Association, subject to the by-laws thereof; but no sale or mortgage of any property of the Association shall be made, except with the approbation and concurrence of a majority at a general meeting of the members of the Association specially called for such purpose:

(*f*) To appoint annually, at its first meeting after the annual general meeting of the Association, a Board of Examiners.

8. It shall be the duty of the registrar to keep a record, in which shall be registered

the names, residences, and place of business of all persons authorized under this act to practice pharmacy in this Province; also the names of all certified apprentices, their residences, and by whom they are employed; and to grant, on application, certificates of such registration upon the payment of the prescribed fee; and to perform such other work as shall be set forth in the by-laws of the Association.

9. The annual general meeting of the Association shall be held alternately in Victoria, Vancouver, New Westminster, and Nanaimo, or such other place as the Council may direct, on the second Thursday in the month of June of each year, or on such other day near thereto as shall be determined upon by the Council. Votes by proxy in writing shall be legal at all meetings. Special meetings may be called by the president, upon the written request of ten members of the Association, which request shall state the business to be transacted, and at such meeting that business only shall be transacted.

10. The board of examiners shall examine the candidates and grant such certificates or diplomas as they may think proper to those whom they deem qualified to be "licentiates of Pharmacy" or "certified apprentices."

11. The board of examiners shall dispense with the examination and accept in lieu thereof authenticated certificates of examination by authorized examining boards of any Pharmaceutical Association. Such certificates must be accompanied by certificates of good moral character, and shall be subject to such other regulations as may be provided for in the by-laws of this Association: Provided, that the by-laws of the Association shall not require on the part of the applicant any previous residential qualification.

12. That it shall be unlawful for any person to practise, or attempt to practise, the profession of a chemist and druggist, or assume or use the title of chemist and druggist, or chemist, or druggist, or pharmacist, or apothecary, or dispensing chemist, or dispensing druggist, within the limits of an incorporated city or town, or one mile thereof, in the Province of British Columbia, without having first received a diploma from the faculty of some reputable college of pharmacy duly authorized by the laws of Great Britain or its dependencies, or the laws of some foreign government, and without having had issued to him a certificate under the provisions of this act; provided, that all persons who, at any time before the coming into force of this act, were practising in this Province on their own account as chemists and druggists or apothecaries, are entitled to be registered in conformity with this act as Licentiates of Pharmacy upon producing before the registrar evidence of their having exercised their profession as aforesaid: provided, also, that all clerks who have acted in that capacity for at least four years prior to the passing of this act, and are, at the time of the passing of this act, so engaged in this Province, shall be entitled to be placed on the registry as licentiates, and that all apprentices, who are acting as such at the time of the passing of this act, shall be entitled to be placed on the registry as certified apprentices, and the time they have already served in such capacity shall be allowed them.

13. All persons qualified by this Act to engage in the practice of pharmacy within the Province shall, within three months after the passing of this act, cause their names, residences, and places of business to be registered with the aforesaid registrar, upon which the said registrar shall issue to such persons a certificate, duly signed by the officers of the Association, and which certificate shall entitle the person to whom it is issued to all the rights and privileges set forth in this act. Branch stores in the incorporated cities or towns within the Province must be under the immediate management of a licentiate of pharmacy; and it shall also be unlawful for any person carrying on business under the provisions of this Act to employ any clerk or apprentice who is not qualified under this act.

14. Every person having been registered under this act as a licentiate shall, on retiring from business as a chemist and druggist, give notice to the Registrar in writing of that fact, in default of which he shall remain liable for his annual registration fees:

Provided, that it shall be lawful for any such person to resume the business of chemist and druggist at any time after retiring therefrom as aforesaid, upon giving notice in writing to the registrar of his intention so to do, and upon payment to him of the then current annual registration fee.

15. To provide for the proper enforcement of this act, the said Council shall be entitled to the following fees, viz: For each certificate issued to a licentiate of pharmacy engaged in business on his own account, or in partnership with any other person, a sum not exceeding ten dollars annually; for each certificate issued to a licentiate of pharmacy, acting in the capacity of a clerk, a sum not exceeding five dollars annually; and for each apprentice, a sum not exceeding two dollars annually.

16. No person shall, within the limits of any incorporated city or town in this Province keep open shop for the retailing, dispensing or compounding poisons, or sell, or attempt to sell, any of the articles mentioned in Schedule "A" to this act, unless such person is registered under this act, under the penalty set forth in section 21 in this act.

17. Articles named or described in Schedule "A" shall be deemed to be poisonous within the meaning of this act; and the said Council hereinbefore mentioned may from time to time by resolution declare that any article in such resolution named ought to be deemed a poison within the meaning of this act, and thereupon the said Council shall submit the same for the approval of the Lieutenant-Governor in Council; and if such approval is given, then such resolution and approval shall be advertised in the British Columbia Gazette, and on the expiration of one month from such advertisement the article named in such resolution shall be deemed to be a poison within the meaning of this act, and the same shall be subject to the provisions of this act, or such of them as may be directed by the Lieutenant-Governor in Council.

18. No person shall sell any poison named in Schedule "A" either by wholesale or retail unless the box, bottle, wrapper or cover in which such poison is contained is distinctly labelled with the name of the article and the word "poison," and if sold by retail, then also with the name and address of the proprietor of the establishment in which such poison is sold; and no person shall sell any poison mentioned in Schedule "A" to any person unknown to the seller unless introduced by some person known to the seller, and on every sale of any such article the person actually selling the same shall, before delivery, make an entry in a book to be kept for that purpose in the form set forth in Schedule "C" to this act, stating the date of the sale, the name and address of the purchaser, the name and quantity of the article sold, the purpose for which it is stated by the purchaser to be required, and the name of the person, if any, who introduced him, to which entry the signature of the purchaser shall be affixed, under the penalty set forth in section 21 of this act.

19. Any article enumerated in Schedule "B" to this act shall not be sold unless the container of such be distinctly labelled with the name of the article, name and address of the seller, and the word "poison" affixed thereto, under the penalty set forth in section 21 of this act.

20. Any person selling any poison in violation of this act, or contravening any of the provisions of this act, shall for the first offence incur a penalty not exceeding twenty dollars and costs of prosecution, and for each offence committed subsequent to such conviction a penalty not exceeding fifty dollars and costs of prosecution, to be recovered in a summary manner before two Justices of the Peace or Police Magistrate, on the oath of one or more credible witnesses.

21. In any prosecution under this act it shall be incumbent upon the defendant to prove that he is entitled to sell or keep open shop for compounding medicines or retailing poisons, and to assume the title of chemist and druggist, and other title mentioned in section 12 of this act, and the production of a certificate purporting to be under the hand of the registrar of this Association showing that he is entitled shall be prima facie evidence that he is so entitled.

22. Nothing in this act shall prevent any person whatever from selling goods of any kind to any person legally authorized to carry on the business of an apothecary, chemist or druggist, or the profession of a doctor of medicine, physician or surgeon, dentist or veterinary surgeon, nor prevent the members of such professions supplying to their patients such medicines as they may require, nor interfere with the business of wholesale dealers in supplying poisons or other articles in the ordinary course of wholesale dealing.

23. Upon the decease of any person legally authorized and actually carrying on the business of chemist and druggist at the time of his death, it shall be lawful for the executor, administrator or trustee of the estate of such person to continue such business bona fide, provided it is conducted by a licentiate of pharmacy registered under this act, provided such executor, administrator or trustee continue to pay the annual registration fee hereby directed to be paid by members of the said Pharmaceutical Association.

24. The Secretary of the said Council shall, on or before the fifteenth day of January in each and every year, enclose to the Provincial Secretary a list of all persons to whom certificates have been granted, and the qualifications therefor, and such list shall be published in the British Columbia Gazette.

25. If any person after a period of three months after the passing of this act not holding a valid certificate practises the said profession of pharmacy within the limits prescribed in clause twelve, or wilfully and falsely pretends to hold a certificate under this act, or takes or uses any name, addition or description implying that he is duly authorized to practice the profession or calling of pharmacy, he shall, upon summary conviction thereof before any two Justices of the Peace or Stipendiary Magistrate, for any and every such offence, pay a penalty not exceeding one hundred dollars nor less than twenty-five dollars.

26. Any person who presents a prescription to any qualified druggist to be filled shall be entitled to have such prescription returned to him by such druggist.

27. It shall be lawful for the Lieutenant-Governor in Council to appoint a fit and proper person to be known as "Public Analyst," who must be a member of the Pharmaceutical Association, and who may be allowed to charge such fees in respect of analyses to be made by him as the Lieutenant-Governor in Council may approve.

28. Nothing in this act shall prevent any duly qualified members of the medical profession or surgeon from engaging in or carrying on the business of an apothecary, chemist or druggist without registration under the provisions of this act.

## SCHEDULE A.

*List of Poisons.*

Aconite and its preparations; arsenic and its preparations; belladonna and its preparations; cantharides; corrosive sublimate; cyanide of potassium and all metallic cyanides; ergot of rye and its preparations; essential oil of almonds, unless deprived of prussic acid; euphorbium; opium and its preparations, except paregoric and syrup of poppies; prussic acid; savin and its oil; St. Ignatius' bean; strychnine and all poisonous vegetable alkaloids and their salts; tartar emetic.

## SCHEDULE B.

Acetate of lead; oxalic acid; calabar beans; carbolic acid; chloral hydrate; chloroform and ether; croton oil and seeds; elaterium, Goulard's extract; hellebore; henbane and preparations; iodine: phosphorus; red and white precipitate; verdigris; sulphate of zinc.

SCHEDULE C.

*Poison Sales Register.*

| Date. | Name and address of purchaser. | Name and quantity of poison sold. | Purpose for which poison is required. | Signature of purchaser. | Signature of person introducing purchaser. | Signature of seller. |
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| | | | | | | |

## ONTARIO, CANADA.

### THE PHARMACY ACT OF 1884, WITH AMENDMENTS OF 1889.

Her Majesty, by and with the advice and consent of the Legislative Assembly of the Province of Ontario, enacts as follows:—

1. This act may be cited as "*The Pharmacy Act.*"

2. The Ontario College of Pharmacy, incorporated by the act passed in the thirty-fourth year of her majesty's reign, and chaptered thirty-four, is hereby continued.

3. The Ontario College of Pharmacy shall have power to acquire and hold real estate, not exceeding at any time in annual value five thousand dollars, and may alienate, exchange, mortgage, lease or otherwise charge or dispose of, the said real estate, or any part thereof, as occasion may require, and may erect buildings for the purpose of accommodating lecturers on chemistry or pharmacy, or for a library, pharmaceutical museum, or specimen room for the use of the members and associates of the College; and all fees payable under this act shall belong to the College for the purposes of this act.

4. (1) There shall be a council of the College, to be called the Pharmaceutical Council, which shall consist of thirteen members, who shall be elected as hereinafter provided, and shall hold office for two years, and the council shall, subject to the laws thereof, have sole control of the real and personal property of the College, and have authority to grant certificates of competency to conduct the business of a chemist or druggist, and to be registered subject to the provisions of this act.

(2) The said thirteen members shall be selected from among those members of the College who are actively engaged on their own account, and as proprietors, in the occupation of pharmaceutical chemists, whether carrying on business as retail, wholesale or manufacturing chemists, and who reside within the Province of Ontario.

(3) The council may, at any time hereafter, pass a by-law dividing the Province into thirteen electoral territorial divisions for the purposes of this act; the by-law shall require the assent of the Lieutenant-Governor, and notice thereof in the *Ontario Gazette* for three months. After the expiration of the three months, all general elections of the members of the council shall be held so that each member shall be a resident of, and shall be elected by, the duly qualified members of the College resident in the territorial division. The manner of holding such an election shall, with respect to the time thereof, and the taking of the votes therefor, and the giving of a casting vote in case of equality of votes, be determined by a by-law to be passed by the council, and in default of such by-law, the Lieutenant-Governor may prescribe the time and manner of holding such election.

(4) The council shall have power to rearrange the geographical boundaries of the

electoral territorial divisions every ten years by a by-law, assented to by the Lieutenant-Governor.

5. A member of the council may at any time resign by letter directed to the registrar of the College; and in the event of a vacancy occurring, the remaining members of the council shall fill up such vacancy from the members of the College, "and after the provisions of section 4 relating to the electoral territorial divisions come into operation, such vacancy shall be filled from among members of the College resident in the territorial division represented by the member whose seat has become vacant."

6. An election of members of the council shall be held on the first Wednesday in July in every second year, and the persons qualified to vote at the election shall be such persons as are members of the said College, and are liable to pay the annual fee of $4 under this act.

7. The council shall, at their first meeting, elect from among themselves a president and vice-president, and shall appoint a registrar and such other officers as the council may consider necessary.

8. The council shall hold at least two sittings in every year, on the first Tuesday in February and first Tuesday in August, for the purpose of granting certificates of competency, at such places as they may by resolution appoint. of which due notice shall be given for at least one month in the *Ontario Gazette*, and in at least two newspapers published in the city of Toronto.

9. The council of the said College shall, subject to the supervision and disallowance thereof by the Lieutenant-Governor in council, have authority to prescribe the subjects upon which candidates for certificates of competency shall be examined, to establish a scale of fees not to exceed ten dollars, to be paid by persons applying for examination; and to make by-laws, rules and orders for the regulation of their own meetings and proceedings, and those of the College; and for the remuneration and appointment of examiners and officers of the College; and for defining the duties of such examiners and officers; and for the payment of remuneration or indemnity to the members of the council in attending its sittings, or in attending upon the business of the college; and in respect to any other matters which may be requisite for the carrying out of this act; provided always, that no more than five cents per mile for traveling expenses, or more than four dollars per day for such days only as he shall be in actual attendance upon the business of the College, including going to and returning from such sitting, be allowed to any member for such expenses and remuneration.

10. The examinations of the College may be conducted by the members of the council, or by persons appointed by them.

11. Subject to the rules, regulations and by-laws of the Ontario College of Pharmacy, the following persons and no others may be admitted as candidates for certificates of competency:

(*a*) Any person who shall furnish to the council of the College satisfactory evidence of having in pursuance of a binding contract in writing for that purpose, served as an apprentice to a regularly qualified pharmaceutical chemist for a term of not less than four years. And who has attended two courses of lectures, the first in any college of pharmacy or school of medicine approved by the council, and the second or senior course at the Ontario College of Pharmacy, (such courses to comprise the following subjects, namely, pharmacy, chemistry, materia medica, botany, and reading and dispensing prescriptions,) and who shall have attained the age of twenty-one years. The council shall have power to fix and determine from time to time a curriculum of studies to be pursued by the students.

SUB-SEC. 1. This section shall not apply to students who were registered as apprentices prior to the passing of this act.

SUB-SEC. 2. The period occupied in attending the first of the said two courses of lectures may be counted as part of the term of apprenticeship.

(*b*) In case any person who has apprenticed himself as aforesaid, shall by reason of the death, failure in business, or removal of his employer, or from any other cause satisfactory to the council, be unable to complete his term of apprenticeship with such employer, such person shall be at liberty, when and as often as this may happen, to enter into a new contract to complete the remainder of his unfulfilled term with any other regularly qualified pharmaceutical chemist.

(*c*) Nothing in this section shall apply to any person who had, prior to the 25th day of March, 1884, begun his apprenticeship with a regularly qualified pharmaceutical chemist without such binding contract in writing.

12. Every person who may hereafter be desirous of becoming apprenticed as aforesaid, shall, before the term of his apprenticeship begins to run for the purpose of this act, furnish to the registrar of the College a certificate or other evidence satisfactory to the council, showing that prior to the commencement of his apprenticeship he had passed an examination in the following subjects:

> ARITHMETIC AND MENSURATION—Reduction; simple and compound proportion; vulgar and decimal fractions; square root; areas of rectilineal figures; volumes of right parallelopipeds.
>
> ALGEBRA—Elementary rules; greatest common measure; least common multiple: fractions; simple equations of one unknown quantity.
>
> Political, physical and mathematical geography.
>
> English grammar and composition.

This section does not apply to matriculants in arts or medicine in any British or Colonial university or college, or to holders of second or third-class non-professional certificates issued by the Educational Department of Ontario; or to persons who produce evidence of having passed an examination at least equal to that for the latter; or to persons who have already commenced their apprenticeships, provided that application from such apprentices be made not later than twelve months from the passing of this act.

13. It shall be the duty of the registrar to make and keep a correct register, in accordance with the provisions of this act, as shown in Schedule "B," of all persons who may be entitled to be registered under this act, and to enter opposite the names of all registered persons who have died, a statement of such fact, and from time to time to make the necessary alterations in the addresses of persons registered under this act, and to cause to be printed and published on or before the fifteenth day of June of each year, an alphabetical list of the members who were on the first day of June of that year, entitled to keep open shop as pharmaceutical chemists.

14. Any person having passed such examination as aforesaid to the satisfaction of the council, shall be entered upon the roll of registered chemists and druggists, and shall become a member of the College.

15. All persons approved of by the council of the College, who hold diplomas from the Pharmaceutical Society of Great Britain, or certificates from any pharmaceutical college in the Dominion of Canada or elsewhere, may be registered as members of the Ontario College of Pharmacy without the examination prescribed by this act.

16. No name shall be entered in the register except of persons authorized by this act to be registered, nor unless the registrar is satisfied by proper evidence that the person claiming is entitled to be registered; and any appeal from the decision of the registrar may be decided by the council of the College, and any entry proved to the satisfaction of the council to have been fraudulently or incorrectly made, may be erased from or amended in the register by order of the council.

17. Upon any person being registered under this act, he shall be entitled to receive a certificate in the form of Schedule "D" or to the like effect, under the corporate seal of the College, and signed by the registrar.

18. There shall he payable to the registrar of the College, for the uses of the College, on the first day of May of each year, by every person registered and carrying on business as a pharmaceutical chemist, the sum of four dollars; provided, that in case such person shall carry on business in more than one locality the further sum of four dollars shall be payable by him, as aforesaid, for each additional place of business; and provided, also, that all employees or assistants who manage, or have charge of such additional places of business, shall be legally qualified pharmaceutical chemists.

19. Any person registered under this act, and no other person shall be entitled to be called a pharmaceutical chemist, and no other person, except a pharmaceutical chemist as aforesaid, or his employee or employees, shall be authorized to compound prescriptions of legally authorized medical practitioners; but no person shall be entitled to any of the privileges of a pharmaceutical chemist, or member of the College, who is in default in respect to any fees payable by him by virtue of this act.

20. Upon a resolution of the council of the College being passed, declaring that any person in consequence of his conviction for any offence or offences against this act, is, in the opinion of the council, unfit to be on the register under this act, the Lieutenant-Governor-in-Council may direct that the name of such person shall be erased from the register, and it shall be the duty of the registrar to erase the same accordingly.

21. Every pharmaceutical chemist carrying on business on his own account shall display his certificate in a conspicuous position in his place of business.

22. Every person having been registered under this act or any former act, as a pharmaceutical chemist, shall, on retiring from business as a chemist, give the registrar notice in writing of the same, and his name shall be erased from the register of pharmaceutical chemists and he shall cease to enjoy any of the privileges of the College, and in default of such notice he shall remain liable for his annual registration fee; provided, that it shall be lawful for any such person to resume the business of chemist and druggist at any time after retiring therefrom as aforesaid, upon giving notice in writing to the registrar of the College of his intention so to do, and upon payment to him of the then current annual registration fee.

23. All compounds named in the British Pharmacopœia shall be prepared according to the formula directed in the latest edition published "by authority" unless the College of Physicians and Surgeons of this Province select another standard, or unless the label distinctly shows that the compound is prepared according to another formula.

24. No person shall sell or keep open shop for retailing, dispensing or compounding poisons, or sell or attempt to sell any of the articles mentioned in Schedule "A" to this act, or assume or use the title of "Chemist and Druggist," or "Chemist," or "Druggist," or "Pharmacist," or "Apothecary," or "Dispensing Chemist, or "Dispensing Druggist," in any part of the Province of Ontario, unless such person is registered under this act, and unless such person has taken out a certificate under the provisions of section eighteen of this act, for the time during which he is selling or keeping open shop for retailing, dispensing or compounding poisons, or assuming or using such title; provided, that nothing in this act contained shall be taken to prevent the sale, by persons not registered in pursuance of this act, of Paris green, London purple, and other arsenical insecticides, so long as such articles are sold in well secured packages distinctly labelled with the name and address of the seller and marked "Poison," and a record of such sales is kept as required under the provisions of this act.

25. The several articles named or described in Schedule "A" shall be deemed to be poisonous within the meaning of this act, and the council of the Ontario College of Pharmacy hereinbefore mentioned, may from time to time by resolution declare, that any article in the resolution named ought to be deemed a poison within the meaning of this act, and thereupon the said council shall submit the same for the approval of the Lieutenant-Governor-in-Council, and if approval is given, then such resolution and approval

shall be advertised in the *Ontario Gazette*, and on the expiration of one month from the advertisement the article named in the resolution shall be deemed to be a poison within the meaning of this act, and the same shall be subject to the provisions of this act, or such of them as may be directed by the Lieutenant-Governor-in-Council.

26. No person shall sell any poison named in the first part of Schedule "A," either by wholesale or retail, unless the box, bottle, vessel, wrapper or cover in which the poison is contained is distinctly labelled with the name of the article and the word "Poison," and if sold by retail, then also with the name and address of the proprietor of the establishment in which such poison is sold; and no person shall sell any poison mentioned in the first part of Schedule "A" to any person unknown to the seller unless introduced by some person known to the seller; and on every sale of any such article the person actually selling the same shall, before delivery, make an entry in a book to be kept for that purpose, in the form set forth in Schedule "C" to this act, stating the date of the sale, the name and address of the purchaser, the name and quantity of the article sold, the purpose for which it is stated by the purchaser to be required, and the name of the person, if any, who introduced him, to which entry the signature of the purchaser shall be affixed.

27. No person shall wilfully or knowingly sell any article under the pretence that it is a particular drug or medicine which it is not in fact, and any person so doing (besides any other penalties to which he may be liable) shall be subject to the penalties prescribed by by section 28 of this act.

28. Any person transgressing any of the provisions of this act, or selling any poison in violation thereof, shall for the first offence incur a penalty of twenty dollars and costs of prosecution, and for each offence committed subsequent to such conviction, a penalty of fifty dollars and costs of prosecution, to be recovered in a summary manner before one or more Justices of the Peace or Police Magistrate, on the oath of one or more credible witnesses, one moiety to belong to the prosecutor and the other to be paid to the registrar for the use of the College.

29. In any prosecution under this act it shall be incumbent upon the defendant to prove that he is entitled to sell or keep open shop for compounding medicines or retailing poisons, and to assume the title of chemist and druggist, or other title mentioned in section twenty-four of this act, and to give evidence sufficient *prima facie* to prove that no unregistered person who personally takes any part whatever in selling or dispensing drugs or medicines is interested with him in his sales as chemist and druggist, and the production of a certificate purporting to be under the hand of the registrar and under the seal of the College, showing that he is so entitled, shall be *prima facie* evidence that he is so entitled, but nothing in this section or section 29 of the said act as amended hereby shall be construed as in any way amending or qualifying section 32 of the said act.

30. No person selling articles in violation of the provisions of this act shall recover any charges in respect thereof in any Court of Justice.

31. Nothing in this act contained shall extend to or interfere with the privileges conferred upon legally qualified medical practitioners by *The Ontario Medical Act*, provided that where such medical practitioner desires to carry on the business of a pharmaceutical chemist as defined by this act, he shall not be required to pass the examination prescribed by the College of Pharmacy, but he shall register as a pharmaceutical chemist, and comply with all other requirements of this act; nor shall anything in this act prevent any person whatsoever from selling goods of any kind to any person legally authorized to carry on the business of an apothecary, chemist or druggist, or the profession of a doctor of medicine, physician or surgeon, or veterinary surgeon, nor prevent the members of such professions supplying to their patients such medicine as they may require, nor interfere with the business of wholesale dealers in supplying poisons or other articles in the ordinary course of wholesale dealing.

32. Upon the decease of any person legally authorized and actually carrying on the business of chemist and druggist at the time of his death, it shall be lawful for the executor, administrator or trustee of the estate of such person to continue the business if and so long only as such business is *bona fide* conducted by a pharmaceutical chemist registered under this act, provided such executor, administrator or trustee continues to pay the annual registration fee of four dollars.

33. It shall be competent for the council of the College to elect as honorary members such persons as may be eminent for their scientific attainments, but such honorary members shall not as such be entitled to vote at elections or carry on the business of pharmaceutical chemists.

34. In each of the territorial electoral divisions described in a by-law hereafter duly passed by the council under this act and the amendments thereto, there may be established a Territorial Division Pharmaceutical Association, which may be called "Division Association" of such division, of which every member of the College residing in such division shall be a member, and the representative in the council shall be *ex-officio* chairman of such Division Association.

## SCHEDULE "A."

(*Secs. 24, 25 and 26.*)

PART II.

Acid, hydrocyanic (Prussic); aconite and compounds thereof; antimony, tartrate of; arsenic and all the compounds thereof; atropine; carbolic acid; chloral hydrate; cocaine and its preparations; conia, and the compounds thereof; corrosive sublimate; digitaline; ergot; hemp, Indian; morphia, and its salts and solutions; oil, cedar; strychnine and nux vomica; savin and preparations of; veratria.

PART II.

Acid, oxalic; belladonna, and the compounds thereof: beans, Calabar; cantharides; chloroform and ether; conium, and the preparations thereof; croton oil and seeds; cyanide of potassium; euphorbium; elaterium; Goulard extract; hyoscyamus and preparations; hellebore; iodine; opium, with its preparations, including laudanum, etc., but not paregoric; pink root; podophyllin; potassium, iodide of; potassium, bromide of; St. Ignatius beans; santonine; scammony; strammonium and preparations; valerian; verdigris; zinc, sulphate of.

## SCHEDULE "B," SEC. 13.

| NAME. | RESIDENCE. | QUALIFICATION. | REMARKS. |
|---|---|---|---|
| A. B. | Kingston. | In business for three years prior to 5th Feb., 1871. | Dead. |
| C. D. | Hamilton | Examined and certified July 12, 1871. | Erased by order of the Lieut. Gov., dated 14 Oct., 1875. |
| E. F. | London. | Served apprenticeship and as assistant. | |

SCHEDULE "C," SEC. 26.

| Date. | Name of Purchaser. | Name and Quantity of Poison sold. | Purpose for which it is required. | Signature of Purchaser. | Address of Purchaser. | Name of person introducing purchaser. |
|---|---|---|---|---|---|---|
| | | | | | | |

SCHEDULE "D," SEC. 17.

I hereby certify that C. D. having complied with the requirements of the Pharmacy Act was on the day of , A. D., 18 , duly registered as a Pharmaceutical chemist, and is authorized to carry on the business of chemist and druggist in the Province of Ontario from the day of , 18 , to the day of , 18 .

(Signed)
R. F.
*Registrar of the Ontario College of Pharmacy.*

{ CORPORATE SEAL. }

## THE PADDOCK BILL.

In the House of Representatives, March 11, 1892. Referred to the Committee on Foreign Commerce.

March 15, 1892. The Committee on Interstate and Foreign Commerce discharged and referred to the Committee on Agriculture.

March 29, 1892. Reported with amendments, referred to the House Calendar, and ordered to be printed.

### AN ACT FOR PREVENTING THE ADULTERATION AND MISBRANDING OF FOOD AND DRUGS, AND FOR OTHER PURPOSES.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That for the purpose of protecting the commerce in food products and drugs between the several States, the District of Columbia, and the Territories of the United States and foreign countries, the Secretary of Agriculture shall organize in the Department of Agriculture a section to be known as the food section of the chemical division, and make necessary rules governing the same, to carry out the provisions of this act under direction of the chief chemist, whose duty it shall be to procure from time to time, under rules and regulations to be prescribed by the Secretary of Agriculture, and analyze or cause to be analyzed or examined samples of food and drugs offered for sale in any State or Territory other than where manufactured or in a foreign country, provided the same be in original or unbroken packages. The Secretary of Agriculture is hereby authorized to employ such chemists, inspectors, clerks, laborers, and other employees as may be necessary to carry out the provisions of this act.

SEC. 2. That the introduction into any State or Territory or the District of Columbia or foreign country of any article of food or drugs which is adulterated or misbranded within the meaning of this act is hereby prohibited, and any person who shall knowingly ship or deliver for shipment from any State or Territory or the District of Columbia or foreign country to any other State or Territory or the District of Columbia or to a forf eign country, or who shall knowingly receive in any State or Territory or the District o- Columbia from any other State or Territory or the District of Columbia or foreign coun-

try, or who, having so received, shall knowingly deliver, for pay or otherwise, or offer to deliver to any other person, in original unbroken packages, any such article so adulterated or misbranded within the meaning of this act, shall be guilty of a misdemeanor, and for such offense be fined not exceeding two hundred dollars for the first offense, and for each subsequent offense not exceeding three hundred dollars, or be imprisoned not exceeding one year, or both, in the discretion of the court.

SEC. 3. That the chief chemist shall make, or cause to be made, under rules and regulations to be prescribed by the Secretary of Agriculture, examinations of specimens of food and drugs offered for sale in original or unbroken packages in any State or Territory other than where manufactured or in a foreign country which may be collected from time to time, under rules and regulations to be prescribed by the Secretary of Agriculture, and under his direction in various parts of the country, and publish in bulletins the results of such analyses. But the names of manufacturers or venders of such foods or drugs analyzed shall in no case be published in such bulletins until after conviction in the courts of violation of this act. If it shall appear from such examination that any of the provisions of this act have been violated the Secretary of Agriculture shall at once cause a report of the fact to be made to the proper United States district attorney, with a copy of the results of the analysis duly authenticated by the analyst under oath.

SEC. 4. That it shall be the duty of every district attorney to whom the *Secretary of Agriculture* shall report any violation of this act to cause proceedings to be commenced and prosecuted without delay for the fines and penalties in such case provided, unless, upon inquiry and examination, he shall decide that such proceedings can not probably be sustained, in which case he shall report the facts to the *Secretary of Agriculture*.

SEC. 5. That the term "drug," as used in this act, shall include all medicines for internal or external use. The term "food," as used herein, shall include all articles used for food or drink by man, whether simple, mixed, or compound. The term "misbranded," as used herein, shall include all drugs, or articles of food, or which enter into the composition of food, the package or label of which shall bear any statement purporting to name any ingredients or substances as not being contained in such article, which statement shall be false in any particular; or any statement purporting to name the substances of which such article is made, which statement shall not fully give the names of all the substances contained in such article in any measurable quantities.

SEC. 6. That for the purposes of this act an article shall be deemed to be adulterated—

In case of drugs:

First. If when sold under or by a name recognized in the United States Pharmacopœia it differs from the standard of strength, quality, or purity according to the tests laid down therein.

Second. If when sold under or by a name not recognized in the United States Pharmacopœia, but which is found in some other Pharmacopœia or other standard work on materia medica, it differs materially from the standard of strength, quality, or purity according to the tests laid down in said work.

Third. If its strength or purity fall below the professed standard under which it is sold.

Fourth. If it be an imitation of and sold under the specific name of another article.

In the case of food or drink:

First. If any substance or substances has or have been mixed and packed with it so as to reduce or lower or injuriously affect its quality or strength, so that such product, when offered for sale, shall be calculated and shall tend to deceive the purchaser.

Second, If any inferior substance or substances has or have been substituted wholly or in part for the article, so that the product, when sold, shall tend to deceive the purchaser.

Third. If any valuable constituent of the article has been wholly or in part abstracted, so that the product, when sold, shall tend to deceive the purchaser.

Fourth. If it be an imitation of and sold under the specific name of another article.

Fifth. If it be mixed, colored, powdered, or stained in a manner whereby damage is concealed, so that such product, when sold, shall tend to deceive the purchaser.

Sixth. If it contain any added poisonous ingredient or any ingredient which may render such article injurious to the health of the person consuming it.

Seventh. If it consists of the whole or any part of a diseased, filthy, decomposed, or putrid animal or vegetable substance, or any portion of an animal unfit for food, whether manufactured or not, or if it is the product of a diseased animal, or of an animal that has died otherwise than by slaughter: *Provided*, That an article of food or drug which does not contain any added poisonous ingredient shall not be deemed to be adulterated, in the following cases:

First, in the case of mixtures or compounds which may be now or from time to time hereafter known as articles of food under their own distinctive names, and not included in definition fourth of this section;

Second, in the case of articles labeled, branded, or tagged so as to plainly indicate that they are mixtures, compounds, combinations, or blends;

Third, when any matter or ingredient has been added to the food or drug because the same is required for the production or preparation thereof as an article of commerce in a state fit for carriage or consumption, and not fraudulently to increase the bulk, weight, or measure of the food or drug, or conceal the inferior quality thereof: *Provided*, That, the same shall be labeled, branded, or tagged, so as to show them to be compounds and the exact character thereof: *And provided further*, That nothing in this act shall be construed as requiring or compelling proprietors or manufacturers of proprietary medicines to disclose their trade formulas;

Fourth, where the food or drug is unavoidably mixed with some extraneous matter in the process of collection or preparation.

SEC. 7. That every person who manufactures for shipment and delivers for transportation from any State or Territory to any other State or Territory any drug or article of food, and every person who exposes for sale or delivers to a purchaser any drug or article of food received from a State or Territory other than the State or Territory in which he exposes for sale or delivers such drug or article of food, and which article is in the original unbroken package in which the same was received, shall furnish within business hours and upon tender and full payment of the selling price a sample of such drugs or articles of food to any person duly authorized by the Secretary of Agriculture to receive the same, and who shall apply to such manufacturer or vender, or person delivering to a purchaser such drug or article of food for such sample for such use, in sufficient quantity for the analysis of any such article or articles in his possession. And in the presence of such dealer and an agent of the food section, if so desired by either party, said sample shall be divided into three parts and each part shall be sealed by the seal of the food section. One part shall be left with the dealer, one delivered to the food section, and one deposited with the United States district attorney for the district in which the sample is taken. Said manufacturer or dealer may have the sample left with him analyzed at his own expense, and if the results of said analysis differ from those of the food section, the sample in the hands of the district attorney shall be analyzed by a third chemist, who shall be appointed by the president of the Association of Official Agricultural Chemists of the United States, in the presence of the chemist of the food section and the chemist representing the dealer, and the whole evidence shall be laid before the court.

SEC. 8. That whoever refuses to comply, upon demand, with the requirements of section seven of this act shall be guilty of a misdemeanor, and, upon conviction, shall be fined not exceeding one hundred nor less than ten dollars, or imprisoned not exceeding one hundred nor less than thirty days, or both. And any person found guilty of manufacturing, or knowingly offering for sale, or selling an adulterated, impure, or misbranded

article of food or drug in violation of the provisions of this act which is a subject of interstate commerce shall be adjudged to pay, in addition to the penalties heretofore provided for, all the necessary costs and expenses incurred in inspecting and analyzing such adulterated articles which said person may have been found guilty of manufacturing, selling, or offering for sale.

SEC. 9. That this act shall not be construed to interfere with commerce wholly internal in any State, nor with the exercise of their police powers by the several States.

SEC. 10. Any article of food or drug that is adulterated, within the meaning of this act, and is transported, or, is being transported from one State to another, for sale, and is still in the original, or unbroken packages, shall be liable to be proceeded against, in any district court of the United States, within the district where the same is found and seized for confiscation, by a process of libel for condemnation. And if such article is condemned as being adulterated, the same shall be *disposed of as the said court may direct*, and the proceeds thereof, *if sold*, less the legal costs and charges, shall be paid into the Treasury of the United States. The proceedings in such libel cases shall conform, as near as may be, to proceedings in admiralty, except that either party may demand trial by jury, of any issue of fact joined in such case, and all such proceedings shall be at the suit of and in the name of the United States.

Passed the Senate March 9, 1892.

Attest. ANSON G. McCOOK, *Secretary*.

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## FLORIDA AMENDMENTS.

The pharmacy law of this State was radically changed in 1889. The following is its full text:

AN ACT TO REGULATE THE PRACTICE OF PHARMACY, AND THE SALE OF POISONS IN CITIES AND TOWNS OF MORE THAN TWO HUNDRED INHABITANTS IN THE STATE OF FLORIDA, AND TO AFFIX PENALTIES.

*Be it enacted by the Legislature of the State of Florida:*

SECTION 1. Be it enacted by the Legislature of the State of Florida, that from and after the passage of this act, it shall be unlawful for any person not a registered pharmacist, within the meaning of this act, to conduct any pharmacy, drug store, apothecary shop, or store, located in any village, town or city in the State of Florida, of more than 200 inhabitants, or within two miles of any incorporated city or town of more than 200 inhabitants, for the purpose of retailing, compounding or dispensing medicines or poisons for medical use, except as hereinafter provided.

SEC. 2. *Be it further enacted*, That it shall be unlawful for the proprietor of any store or pharmacy in any village, town, or city, in the State of Florida, of more than 200 inhabitants, or within two miles of any incorporated city or town of more than 200 inhabitants, to allow any person except a registered pharmacist to compound or dispense the prescriptions of physicians, or to retail or dispense poisons for medical use, except as an aid to, and under the supervision of a registered pharmacist. Any person violating the provisions of this section shall be deemed guilty of a misdemeanor, and on conviction shall be liable to a fine of not less than $25 nor more than $100 for each and every offense.

SEC. 3. *Be it enacted*, That the Governor shall appoint five persons from among the most prominent pharmacists of the State, all of whom shall have been residents of the State for five years, and of at least four years' practical experience in their profession, who shall be known and styled "Board of Pharmacy for the State of Florida," one of whom shall hold his office for one year, one for two years, and one for three years, two for four years, each until his successor shall be appointed and qualified; and each year thereafter another commissioner shall be so appointed for four years, and until a suc-

cessor is appointed and qualified. If a vacancy occur in said board, another commissioner shall be appointed as aforesaid to fill the unexpired term thereof. Said board shall have power to make by-laws and all necessary regulations, and create auxiliary boards, if necessary, for the proper fulfillment of their duties under this act, without expense to the State.

SEC. 4. *Be it further enacted*, That the Board of Pharmacy shall register in a suitable book, the names and places of residence of all persons to whom they issue certificates, and dates thereof. It shall be the duty of said Board of Pharmacy to register, without examination, as registered pharmacists, all pharmacists and druggists who are engaged in business in the State of Florida, at the passage of this act, as owners or principals of stores or pharmacies in any village, town or city of more than 200 inhabitants, for selling at retail, compounding or dispensing drugs, medicines or chemicals, for medical uses, or compounding or dispensing physicians' prescriptions, and all assistant pharmacists eighteen years of age, engaged in said stores or pharmacies in any village, town or city of more than two hundred inhabitants in the State of Florida, at the passage of this act, and have been engaged two years as such in some store or pharmacy where physicians' prescriptions were compounded or dispensed; *Provided, however*, That in case of failure or neglect on the part of any person or persons to apply for registration within sixty days after they shall have been notified by said Board of Pharmacy for the State of Florida, they shall undergo an examination as is provided for in section five of this act.

SEC. 5. *Be it further enacted*, That the said Board of Pharmacy shall, upon application of ten applicants for examination, and at such time and place, and in such manner, as they may determine either by a schedule of questions to be answered and subscribed to under oath, or orally examine each and every person, who shall desire to conduct the business of selling at retail, compounding or dispensing drugs, medicines or chemicals for medicinal use, or compounding or dispensing physicians' prescriptions as pharmacists, and if a majority of said board shall be satisfied that said person is competent and fully qualified to conduct said business of compounding or dispensing drugs, medicines or chemicals for medical use, or to compound or dispense physicians' prescriptions, they shall enter the name of such person as a registered pharmacist in a book provided for in section four of this act; and that all graduates of colleges of pharmacy, that require a practical experience in pharmacy of not less than four years before granting a diploma, shall be entitled to have their names registered by said Board without examination; *Provided, however*, That this act shall not be so construed as to prevent any physician who is authorized to practice medicine or surgery under the laws of this State, from registering as a pharmacist or druggist, without examination; *Provided*, That any person or persons, not a pharmacist or druggist, may open and conduct such store if he or they keep constantly in their employ a registered pharmacist or druggist; but shall not himself or themselves sell or dispense drugs or medicines except proprietary and patent medicines in original packages.

SEC. 6. *Be it further enacted*, That the Board of Pharmacy shall be entitled to demand and receive of each person whom they register and furnish a certificate as a registered pharmacist without examination, the sum of $2 and for each and every person that they examine orally, or whose answers to a schedule of questions are returned, subscribed to under oath, the sum of $3, which shall be in full for all services; and in case the examination of said person shall prove defective and unsatisfactory and his name not be registered, he shall be permitted to present himself for examination within any period not exceeding twelve months thereafter and no charge shall be made for such examination.

SEC. 7. *Be it further enacted*, That every registered pharmacist, apothecary and owner of any store shall be held responsible for the quality of all drugs, chemicals or medicines he may sell or dispense, with the exception of those sold in original packages of the manufacturer, and also those known as proprietary, and should he knowingly intermingle

and fraudulently adulterate, or cause to be adulterated, such drugs, chemicals or medical preparations, he shall be deemed guilty of a misdemeanor, and upon conviction thereof be liable to a penalty not exceeding $100, and in addition thereto his name shall be stricken from the register.

SEC. 8. *Be it further enacted*, That it shall be unlawful for any person, from and after the passage of this act, to retail any poisons enumerated below, arsenic and its preparations, corrosive sublimate, white and red precipitate, biniodide of mercury, cyanide of potassium, hydrocyanic acid, strychnine, and all other poisonous vegetable alkaloids, and their salts, and the essential oil of almonds, opium and its preparations, except paregoric and other preparations of opium containing less than two grains to the ounce; aconite, belladonna, colchicum, conium, nux vomica, henbane, savin, ergot, cotton root, cantharides, creosote, veratrum, digitalis, and their pharmaceutical preparations, croton oil, chloroform, chloral hydrate, sulphate of zinc, mineral acids, carbolic and oxalic acids, without labelling the box, vessel or paper in which said poison is contained, with the name of the article, the word poison, and the name and place of business of the seller. Nor shall it be lawful for any person to deliver or sell any poisons enumerated above unless, upon due inquiry, it be found that the purchaser is aware of its poisonous character and represents that it is to be used for a legitimate purpose. The provisions of this section shall not apply to the dispensing of poisons in not unusual quantities or doses upon the prescription of practitioners of medicine. Any violation of this section shall make the principal of said store liable to a fine of not less than $10 or more than $100; *Provided, however*, That this section shall not apply to manufacturers making and selling at wholesale any of the above poisons; *And provided*, That each box, vessel or paper in which said poison is contained shall be labeled with the name of the article, the word poison, and the name and place of business of the seller.

SEC. 9. *Be it further enacted*, That any itinerant vendor of any drug, poison, ointment or appliance of any kind intended for treatment of any disease or injury, who shall, by writing or printing, or any other method, publicly profess to cure or treat disease or injury or deformity by any drug, nostrum or manipulation, or other expedient, shall pay a license of $100 per annum to the State, to be paid in the manner for obtaining public license or according to the usual laws in force for that purpose.

SEC. 10. *Be it further enacted*, That any person who shall procure or attempt to procure, registration for himself or for another under this act, by making or causing to be made false representations, shall be guilty of a misdemeanor, and shall, upon conviction thereof, be liable to a penalty of not less than $25, nor more than $100, and the name of the person so falsely registered shall be stricken from the register. Any person not a registered pharmacist, as provided for in this act, who shall conduct such a store, pharmacy or place for retailing, compounding or dispensing drugs, medicines, or chemicals, for medical use, or for compounding or dispensing physicians' prescriptions, or who shall take, use or exhibit the title of registered pharmacist, shall be guilty of a misdemeanor, and upon conviction thereof, shall be liable to a penalty of not less than $100.

SEC. 11. This act shall not apply to physicians, putting up their own prescriptions.

SEC. 12. *Be it further enacted*, That it shall be the duty of every registered pharmacist to conspicuously post his certificate of registration in his place of business. Any person who shall fail to comply with all the provisions of this section, shall be liable to a fine of $5 for each calendar month during which he is delinquent.

SEC. 13. The sum of $500 per year, or as much thereof as may be found necessary, is hereby appropriated out of the money so received for license for the expense of said Board of Pharmacy. All surplus over and above said amount to be divided as follows: One half to the Pharmaceutical Association, the remainder to be paid into the State treasury.

SEC. 14. All suits for the recovery of the several penalties prescribed in this act shall

be presented in the name of the State of Florida in any court having jurisdiction, and it shall be the duty of the State's attorney of the county wherein such offense is committed to present all persons violating the provisions of this act, upon proper complaint being made.

SEC. 15. *Be it further enacted,* That all laws and parts of laws in conflict with the provisions of this act be and the same are hereby repealed.

Approved May 30, 1889.

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## GEORGIA.

The Georgia law was amended as follows in 1891:

AN ACT TO ESTABLISH THE GEORGIA STATE BOARD OF PHARMACY, AND TO PRESCRIBE THE POWERS AND DUTIES OF SAID BOARD, AND TO REGULATE THE COMPOUNDING AND VENDING OF MEDICINES, DRUGS AND POISONS IN THE STATE OF GEORGIA, AND TO PROVIDE A PENALTY FOR THE INFRINGEMENT OF THE PROVISIONS OF THIS ACT.

SECTION 1. *The General Assembly of the State of Georgia do enact,* That, within sixty days after the passage of this act, the Governor of the State shall appoint five experienced druggists or practical pharmacists, from the names of ten persons suggested by the Georgia Pharmaceutical Association, who shall have been actively engaged in the drug business within this State for the last three years immediately preceding their appointment, and these five druggists or practical pharmacists, so appointed, shall constitute the Georgia State Board of Pharmacy, one of whom shall hold his office for one year, one for two years, one for three years, one for four years, and one for five years, until his successor shall have been appointed and qualified. And at each and every annual meeting thereafter, the said Georgia Pharmaceutical Association shall submit to the Governor the names of five persons with the qualifications hereinbefore mentioned, and the Governor shall appoint from the names so submitted, one member of said Board, who shall hold his office for five years, until his successor is appointed and qualified. (This amendment not to affect the term of office of the present Board.)

SEC. 3. Be it further enacted, That immediately after the appointment and qualification of said Board, they shall meet and organize as a State Board of Pharmacy, elect a chairman and secretary, and adopt such rules, regulations and by-laws as they shall deem necessary to carry into execution the provisions of this act.

SEC. 5. Be it further enacted, That it shall be the duty of the said Board to grant licenses: 1st. To pharmacists who have graduated in a college of pharmacy acknowledged by the American Pharmaceutical Association, and who shall exhibit to the said Board a diploma of the same. 2d. To pharmacists who have obtained a diploma from an authorized foreign college or institution, and who shall exhibit the same to the Board of Pharmaceutic Examiners. 3d. To physicians who are graduates of a regular medical college, and who shall exhibit their diplomas to said Board. 4th. To druggists who, after three years' experience in a drug store kept or managed by a licensed apothecary or pharmacist, shall have passed a satisfactory examination before said Board of Pharmacy. 5th. To pharmacists who have obtained license from such State Boards of Pharmacy as are recognized by said Board. All licenses granted shall be signed by a majority of the whole Board, and shall specify the ground upon which said license is granted, and shall be in such form as the Board shall prescribe; said license must be exhibited in place of business of licentiate.

SEC. 6. Be it further enacted, That all persons applying for examination and license shall pay to the Board of Pharmacy the sum of fifteen dollars, and, if passing the examination, shall be furnished with the license as hereinbefore provided, for which no further fee shall be required or paid. Should the applicant fail to stand a satisfactory ex-

amination, no fee shall be required for a subsequent examination, such subsequent examination not to be granted within six months after the first. And it shall be the duty of the Board to keep a record of its transactions in a book to be kept for that purpose, by the Secretary, said book to be turned over to their successors in office.

SEC. 9. No person shall within this State manufacture for sale, offer for sale, or sell any drug, medicine, chemical, or pharmaceutical preparation which is adulterated. A drug, medicine, chemical or pharmaceutical preparation shall be deemed to be adulterated: (1) If when sold under or by a name recognized in the U. S. Pharmacopœia, it differs from the standard in strength, quality or purity laid down therein. (2) If when sold under or by a name not recognized in the U. S. Pharmacopœia, but which is found in some other standard work, it differs materially from the standard of strength, quality or purity laid down in such work. (3) If its strength, quality or purity falls below the professed standard.

SEC. 10. Every person manufacturing, offering for sale or selling any drug, medicine, chemical or pharmaceutical preparation, shall furnish to the State Board of Pharmacy, or any person interested or demanding the same, who shall tender him the value of the same, a sample sufficient for the analysis of any such drug, medicine, chemical or pharmaceutical preparation which is in his possession.

SEC. 11. On complaint being made, the Board of Pharmacy is hereby empowered to employ an expert chemist or analyst to examine into the so-claimed adulteration and report upon the result of his investigation; and if said report justify such action the Board shall cause the prosecution of the offender; and any person found guilty of adulteration as defined by this act shall be adjudged to pay, in addition to the fine hereinafter provided for, all necessary costs and expenses incurred in inspecting and analyzing such adulterated articles of which said person may have been found guilty of manufacturing, selling or offering for sale.

SEC. 12. Be it further enacted, That any person who shall violate the provisions of this Act, or shall register fraudulently, shall be guilty of a misdemeanor, and upon conviction shall be punished by a fine not to exceed one hundred dollars, imprisonment not to exceed three months, either or both, at the discretion of the Court. In all cases of prosecution under this Act, the burden shall be upon the defendant to show his authority.

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## MAINE.

In 1891 the Maine law was amended. The full text is given, the amended portion being in italics.

AN ACT TO PREVENT INCOMPETENT PERSONS FROM CONDUCTING THE BUSINESS OF APOTHECARIES.

*Be it enacted by the Senate and House of Representatives in Legislature assembled as follows:*

CHAPTER 379.

SECTION 1. From and after the passage of this act, it shall not be lawful for any person, within the limits of the State, to conduct the business of an apothecary, or any part thereof, except as hereinafter provided.

SEC. 2. The Governor, under the advice and consent of the council, shall appoint three suitable persons to be commissioners of pharmacy, one commissioner to be appointed as the term of each of those now holding office shall expire, to hold office for the term of three years, unless removed for cause, and until a successor is appointed and qualified. If a vacancy occurs in said commission another shall be appointed as aforesaid, to fill the unexpired term thereof. Before entering on the duties of their office, the commissioners shall be sworn to faithfully and impartially discharge the same. *Said*

*commissioners shall make a report of their proceedings annually to the governor and council, who shall cause such a number of said reports to be printed as they deem necessary.*

SEC. 3. Said commissioners shall examine any person who desires to carry on the business of an apothecary, and if he is found skilled in pharmacy, shall give him a certificate of that fact, and that he is authorized to engage in the business of an apothecary, and such certificate must be signed by at least two commissioners. They shall register in a suitable book, to be kept in the office of the Secretary of State, the name and place of residence of all to whom they issue certificates, and the date thereof.

SEC. 4. Every person not now registered, unless he was engaged in the business of apothecary, *in the State of Maine*, on the eleventh day of March, in the year of our Lord eighteen hundred and seventy-seven, continuing in or hereafter entering on the business of an apothecary, shall be examined by said commissioners, and shall present to them satisfactory evidence that he has been an apprentice, or employed in an apothecary store where physicians' prescriptions are compounded, at least three years; or has graduated from some regularly incorporated medical college or college of pharmacy, and is competent for the business; and the commissioners may then grant him a certificate and registry as hereinbefore provided; but only one of the partners in a firm need be a registered druggist, provided, the partner who compounds medicines be registered. And any physician who has a diploma as a graduate of *a duly established medical college in the United States*, and in active practice, may do the business of an apothecary without being registered.

SEC. 5. For each examination under the provisions of this act, the commissioners shall be entitled to receive from the person examined ten dollars, except as hereinafter provided, which shall be in full for all services and expenses. In case the result of the examination is unsatisfactory, and no certificate is granted, the applicant shall have the right to another examination without charge after an interval of two months, and within twelve months after the date of his first examination.

SEC. 6. Certificates of two grades or kinds may be issued, whereof one shall declare that the holder is skilled in pharmacy as in section four of this act, and the other kind which, after the examination of the applicants therefor may be issued to such as shall be not less than eighteen years of age and who have served two full years in an apothecary store where physicians' prescriptions are compounded, shall declare that the holder is a qualified assistant and is competent to take charge of the business of an apothecary, during the temporary absence of his employer, and the fee for such assistant's examination shall be five dollars.

SEC. 7. It shall not be lawful for any apothecary store to be kept open for the sale of medicines or poisons, or for compounding physicians' prescriptions, unless the same is placed and kept under the personal control and supervision of a registered apothecary or qualified assistant who is satisfactory to the owners.

SEC. 8. Any person engaged in the business of apothecary *in the State of Maine*, on the eleventh day of March, in the year of our Lord one thousand eight hundred and seventy-seven, may receive a certificate and be registered as aforesaid on application to said commissioners, with proof of his competency.

SEC. 9. If any person who was not engaged in the business of an apothecary *within the State of Maine* on the eleventh day of March, in the year of our Lord one thousand eight hundred and eighty-seven, shall hereafter engage in or carry on the business of an apothecary, contrary to the provisions of this act, he shall upon indictment and conviction be subject to a penalty of fifty dollars per month for the first offense, and one hundred dollars per month for each and every subsequent offense, whether for continuance in said business or for engaging anew therein in violation of the provisions of this act. *It is hereby made the duty of the County Attorney in each county, upon complaint made by any one of said commissioners, to prosecute all violations of the provisions of this act.*

*The Treasurer of each county shall pay to the Treasurer of the Law Library Association of his county for the use and benefit of the county law library, twenty per cent. of all fines actually paid into the county treasury for the violation of any provisions of this act.*

SEC. 10. The provisions of this act shall apply in the cases of women who shall hereinafter enter upon and carry on the business of apothecaries.

SEC. 11. This act shall not apply in the case of physicians who prepare and dispense their own medicines, nor to the sale of proprietary preparations.

SEC. 12. All acts and parts of acts inconsistent with this act are hereby repealed.

SEC. 13. Any person may enter upon the business of an apothecary without the certificate required by the foregoing act; provided he does not personally do the duties of an apothecary, but employs a duly registered apothecary who has sole charge of compounding, putting up and dispensing medicines and drugs under the provisions of this act.

SEC. 14. No action now pending by virtue of Section six of Chapter twenty-eight of the Revised Statutes shall be maintained except as to costs, or shall hereafter be commenced for any penalty or forfeiture incurred prior to the approval of this act.

SEC. 15. The word apothecary as used in this act shall not include persons who do not compound medicines, put up prescriptions, or sell poisons.

SEC. 16. This act shall take effect when approved.

[As amended by Act approved March 27, 1891.]

## MASSACHUSETTS.

Section three of the law of this State was repealed. It referred to the preliminary work of the Board as to notification of the passage of the law, and fixing limit for registration of persons engaged in business at the time of the enactment of the law.

## NEW YORK.

Since 1889 the following amendments have been enacted.

### LAWS—CHAPTER 181.

### AN ACT RELATING TO THE PRACTICE OF PHARMACY.

Passed, April 24, 1889; three-fifths being present.

*The People of the State of New York, represented in Senate and Assembly, do enact as follows:*

SECTION 1. To entitle any person to a license as a pharmacist or assistant pharmacist from any Board of Pharmacy created under the laws of this State, he must prove to the Board of Pharmacy to which application is made, in addition to the present requirements of the law relating to the granting of licenses by such Boards, that he is a resident of the city, county or district for which the Board of Pharmacy, to which application is made, is created, or, if a non-resident, that he intends to practice in said city, county or district; that he has not applied for a license to, or been examined by, any other Board of Pharmacy of this State and been refused such license within six months immediately preceding, which proof may be made by his own affidavit.

SEC. 2. All acts and parts of acts inconsistent with the provisions of this act are hereby repealed.

SEC. 3. This act shall take effect immediately.

LAWS—CHAPTER 484.

AN ACT TO AMEND CHAPTER SIX HUNDRED AND SEVENTY-SIX OF THE LAWS OF ONE THOUSAND EIGHT HUNDRED AND EIGHTY-SEVEN, ENTITLED "AN ACT TO AMEND CHAPTER THREE HUNDRED AND SIXTY-ONE OF THE LAWS OF ONE THOUSAND EIGHT HUNDRED AND EIGHTY-FOUR, ENTITLED, 'AN ACT TO ESTABLISH A STATE BOARD OF PHARMACY, AND TO REGULATE THE PRACTICE OF PHARMACY THROUGHOUT THE STATE OF NEW YORK, EXCEPT IN THE COUNTIES OF NEW YORK, KINGS AND ERIE."

Passed, June 14, 1889; three-fifths being present.

*The People of the State of New York, represented in Senate and Assembly, do enact as follows:*

SECTION 1. Section four of chapter six hundred and seventy-six of the laws of one thousand eight hundred and eighty-seven, entited "An act to amend chapter three hundred and sixty-one of the laws of one thousand eight hundred and eighty-four, entitled 'An act to establish a State Board of Pharmacy and to regulate the practice of pharmacy throughout the State of New York, except in the counties of New York, Kings and Erie,'" is hereby amended so as to read as follows:

SEC. 4. The phrase, "usual domestic remedies," in said act is hereby defined as follows, namely: Medicines that from common use a knowledge of their properties and dose has been acquired and includes only such remedies as may be safely employed without the advice of a physician, such as Epsom salts, Rochelle salts, salts of tartar, borax, sulphur, magnesia, camphor, aloes, myrrh, guaiac, arnica, rhubarb, senna, squills, ipecac and preparations of above; also castor oil, olive oil, origanum, spike, amber, wintergreen, peppermint, and wormwood, glycerin, spirits of nitre and other like remedies, but does not include opium, morphine, laudanum, strychnine, arsenic, belladonna, aconite, and other poisons requiring knowledge and pharmaceutical skill to safely dispense, unless they be sold in original packages, or packages bearing the label of a licensed pharmacist. The phrase "rural districts," used in said act is hereby declared to apply only to small villages and country districts having less than two stores where pharmacy is practiced. The phrase "practice of pharmacy," used in said act is hereby defined as follows, namely: The compounding of prescriptions or of any United States Pharmacopœial preparation, or of any substance to be used as medicine, or the retailing of any drug or poison for medicinal purposes.

SEC. 2. This act shall take effect immediately.

LAWS—CHAPTER 100.

AN ACT TO AMEND CHAPTER THREE HUNDRED AND SIXTY-ONE OF THE LAWS OF EIGHTEEN HUNDRED AND EIGHTY-FOUR, ENTITLED "AN ACT TO ESTABLISH A STATE BOARD OF PHARMACY, AND TO REGULATE THE PRACTICE OF PHARMACY THROUGHOUT THE STATE OF NEW YORK, EXCEPT IN THE COUNTIES OF NEW YORK, KINGS AND ERIE."

Passed April 9, 1890; three-fifths being present.

*The People of the State of New York, represented in Senate and Assembly, do enact as follows:*

SECTION 1. Section eleven of Chapter Three Hundred and Sixty-one of the laws of eighteen hundred and eighty-four, entitled, "An act to establish a State Board of Pharmacy, and to regulate the practice of pharmacy throughout the State of New York, except in the counties of New York, Kings and Erie," is hereby amended so as to read as follows:

"SEC. 11. Nothing in this act shall be construed to apply to the business of a practitioner of medicine (who is not the proprietor of a store for the retailing of drugs, medicines or poisons), nor to prevent practitioners of medicine from supplying their patients with

such articles as they may deem proper; nor to those who sell medicines and poisons at wholesale; nor to the manufacture or sale of patent or proprietary medicines; nor to the sale of the usual domestic remedies by retail dealers in the rural districts. And nothing in this act shall be so construed as to prohibit the employment in any pharmacy of apprentices or assistants for the purpose of being instructed in the practice of pharmacy, but such apprentices or assistants shall not be permitted to prepare or dispense physicians' prescriptions, or to sell or furnish medicines or poisons, except in the presence of and under the personal supervision of a licensed pharmacist."

SEC. 2. Section twelve of said act is hereby amended so as to read as follows:

"SEC. 12. Any person violating any of the provisions of this act, shall be deemed guilty of a misdemeanor, and on conviction thereof shall be punished by a fine of not less than twenty-five dollars, nor more than fifty dollars, or imprisonment not to exceed six months."

SEC. 3. Section thirteen of said act, is hereby amended so as to read as follows:

"Sec. 13. The expenses of said Board shall be paid out of the fees herein provided for (together with such fines as shall be received by said Board in pursuance of the provisions of section four of this act)."

SEC. 4. One-half of all fines collected for the violation of said act, or the amendments thereof, shall be paid by the committing magistrate to the Treasurer of said Board.

SEC. 5. Courts of special sessions shall have exclusive jurisdiction to hear, try and determine all cases for violations arising under said act, and their jurisdiction is hereby extended so as to enable them to enforce the penalties imposed by any or all sections thereof.

SEC. 6. This act shall take effect immediately.

During the last session of the Legislature several bills were introduced, of interest to pharmacists, in the nature of restrictions or regulations governing the practice of pharmacy in the State, but we have been unable to obtain any definite information as to their passage or rejection.

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## NORTH CAROLINA.

The following amendments to the law of this State were passed in 1891:

AN ACT TO AMEND CHAPTER THIRTY-FOUR, VOLUME TWO OF THE CODE.

*The General Assembly of North Carolina do enact:*

SECTION 1. That Section 3138 of the Code be amended by striking out the words "Pharmaceutical Association" in the third line and inserting "Board of Pharmacy," and by striking out the words "or one who is or has been a regular practicing physician as hereinafter provided" in lines eight and nine.

SEC. 2. That Section 3139 be amended by striking out the words "nor to those who are, have been or may hereafter be regular practicing physicians" in lines nine and ten.

SEC. 3. That Section 3140 be amended by inserting after the word "Secretary" in line nineteen the words "and Treasurer," and by inserting after the word "Secretary" in line twenty, the words "and Treasurer," and by adding to said section the following: "The Secretary and Treasurer of said Board shall be a bonded officer held in bond of one thousand dollars, to be made to the said North Carolina Pharmaceutical Association and approved by the Executive Committee of said Association."

SEC. 4. That Section 3141 be amended by striking out the word "receive" in line nineteen, and inserting the words "be paid," and by inserting after the word "day," in said line, the words "during which he is," and by inserting after the word "board," in line twenty, the words "and all necessary expenses incurred in attending the meetings of

the same," so that the sentence as amended shall read: "Each member of the Board of Pharmacy shall be paid the sum of five dollars for every day during which he is engaged in the service of the Board, and all necessary expenses incurred in attending the meetings of the same."

SEC. 5. That Section 3146 be amended by striking out all of said section after the word "qualified," in line nine, and by inserting in lieu thereof the following: "The North Carolina Pharmaceutical Association shall annually thereafter elect a pharmacist from their number to fill the vacancy annually occurring in said Board. Said pharmacist so elected shall be commissioned by the Governor and hold office for the term of five years, or until his successor has been duly elected and qualified. In case of death, resignation or removal from the State of any member of said Board of Pharmacy the said Board shall elect in his place a pharmacist who is a member of said Association, to serve as a member of the Board for the remainder of the term," and by striking out the word "appointed," in line nine in said section, and inserting the word "elected."

The provisions of this act shall apply to cities and towns of more than eight hundred inhabitants.

SEC. 6. That this act take effect from and after the first day of July, 1891.

In the General Assembly read three times and ratified the 27th day of January, A. D. 1891.

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## SUPREME COURT DECISIONS.

### CALIFORNIA.

Recently the question came before the courts for a decision in consequence of the Board of Pharmacy having refused to register an applicant as a practicing pharmacist. The facts presented were that T. Y. Tallman, in charge of a drug store in Sacramento, which store was owned by another person, and the said Tallman being employed as a manager, demanded to be registered as a practicing pharmacist. To this the Board demurred, stating that they could only register as such the person who actually owned the store, provided he was properly qualified, and offered to register the applicant as an assistant pharmacist.

The parts of the law that relate to the licentiates of the Board are these (we give only the necessary parts of sections):

SECTION 1.— . . . It shall be unlawful for any person to conduct any pharmacy or store for dispensing or compounding medicines unless such person be a registered pharmacist within the meaning of this act; and it shall be unlawful for any person to compound or dispense any physician's prescription, unless such person be a registered pharmacist or a registered assistant pharmacist within the meaning of this act, except as hereinafter stated.

SEC. 2. Any person in order to be a registered pharmacist must be a graduate in pharmacy, a licentiate in pharmacy, or a practicing pharmacist.

SEC. 3. Graduates in pharmacy are persons who have had four years' experience in stores where the prescriptions of medical practitioners are compounded, and each must have obtained a diploma from a legally constituted college of pharmacy. Licentiates must have had four years' similar experience and passed an examination before the State Board of Pharmacy, or who shall present satisfactory credentials or certificates of their attainments to the said Board. Practicing pharmacists are persons who, at the passage of this act, are conducting pharmacies in this State for compounding and dispensing of prescriptions of medical practitioners and for the sale of medicines and poisons. Assistant pharmacists are persons of not less than eighteen years of age who are employed by registered pharmacists, have studied the art of pharmacy for two years, and have passed an examination by the Board of Pharmacy, or who prior to the passage of this act have had three years' experience in pharmacy.

In Section 5 assistant pharmacists who have had over three years' experience are permitted to register without passing an examination on proving that they had over three years' experience, and were so employed at the time of the passage of this act. Then follows, "No registered assistant shall conduct a pharmacy or be granted a certificate as a registered pharmacist until he has passed the examination for licentiate in pharmacy, as required by this act."

The party bringing the suit was not the owner of the store, but a clerk put in charge of it and claiming to be its manager; he also claimed the rights of a practicing pharmacist. If this claim were admitted he would be permitted to continue without the necessity of passing an examination, as he would have to do were he registered as an assistant, as is required in the last clause of Section 5.

THE COURT'S RULING.

Judge Van Fleet denies the writ.

The Court says: "It appears that the petitioner's application to the Board of Pharmacy disclosed the fact that he was not the proprietor or owner of the pharmacy he claimed to be conducting, but simply an employee of the person owning the same; and it was held by the Board that this did not bring petitioner within the class which are entitled to certificates as practicing pharmacists, their contention being that the term 'conducting,' as used in the act, contemplates and implies proprietorship or ownership, with the right of ultimate control in the applicant, in order to entitle him to registration as a 'practicing pharmacist.'

"The contention of the petitioner, on the other hand," continued the court, "is that the term 'conducting,' as here used, does not imply anything of the kind, but is used in its broadest and most ordinary sense, and that a man is conducting a pharmacy within the meaning of the act if he is running it or managing it at the employment of another, without reference to the fact whether he owns any interest or has entire control of the business. I was at first inclined somewhat to this latter view, and taking the language of Section 3 by itself, it might sustain that construction—in an instance where, as here, it appeared that the applicant was employed to manage the business and superintend its details to so great an extent as is the case with petitioner. But looking at the whole act with its various provisions, and having in view the purposes evidently sought to be accomplished by the Legislature, I am constrained to the conclusion that the interpretation put upon it by the respondents is the correct one.

"The evident intent and purpose of the law is to secure the better protection of the public against the dangerous mistakes of incompetent and unskilled persons in the compounding and sale of drugs, medicines and poisons. It contains provisions for bringing within its control several enumerated classes of persons engaged in or connected with the business of carrying on pharmacies or drug stores, and reading the act in its entirety leads one to the inevitable conclusion that it was in contemplation by the law-makers to include all classes of those engaged in or carrying on this character of trade, in whatever capacity connected therewith. While the words 'owner or proprietor' nowhere appear in the act, it is not to be readily concluded that in legislating so comprehensively upon the subject, as was apparently the purpose of the act, it was the intention to exempt from its provisions a class so essentially necessary to an efficient working of the law as the owner or proprietor or person in control of the business.

"That such was not the intent of the Legislature is obvious from the reading of Sections 9 and 11 of the act, wherein certain duties and penalties are prescribed. Section 9 provides that 'every registered pharmacist shall file or cause to be filed all physicians' prescriptions compounded or dispensed in *his* pharmacy or store,' and makes a violation of the provision a misdemeanor. Section 11 provides that 'Any registered pharmacist who shall permit the compounding and dispensing of prescriptions of medical practitioners *in his store* by persons not registered,' etc., shall be guilty of a misdemeanor.

EMPLOYEES NOT INCLUDED.

"These provisions cannot be construed as referring to mere subordinates or employees, but must have reference to proprietors or those having ultimate control of the store or business, otherwise it is apparent that they would be largely inoperative. They could not be enforced, since, as suggested by counsel, an employee might violate the law with impunity, because the act would not be committed in his pharmacy or store, but in that of his employer.

"Taking the whole act together, I am satisfied that the Legislature, in using the expression 'persons who at the passage of this act are conducting pharmacies,' intended and had reference to those having the ultimate control of the business. This construction is in harmony with that given by the Supreme Court of Iowa to substantially the same expression found in the statute of that State, making it unlawful for any person not a registered pharmacist to 'conduct any pharmacy or drug store.' 'If the person conducting a drug store was the defendant,' says the court, 'then he was engaged in an unlawful business, for he was not a registered pharmacist. But he contends that it was his clerk and not himself who was conducting a drug store, and that had he been allowed to show that his clerk was a registered pharmacist, he would have shown that the business of the drug store was lawful. There is no doubt but that a person may lawfully become the proprietor of a stock of drugs without being a registered pharmacist. But being such proprietor is quite different from conducting a drug store. A room in the building in which the business of selling drugs is conducted is a drug store, and

THE CONDUCTOR OF THE STORE,

within the meaning of the statute, is, we think, the person who has the ultimate right to control the business in respect to its continuance or discontinuance, the employment of clerks, the fixing of prices, etc. It happens not with what power a mere clerk may be clothed, he cannot be said to be the conductor of the store when his powers are merely derivative.' State *vs.* Norton, 67 Iowa, 641.

"So, in this case, the petitioner cannot, in the sense of the statute, be held to be the conductor of the pharmacy or store in which he is employed. He is engaged to manage the business of the store for his employer with, it is true, considerably enlarged powers over the ordinary drug clerk; but nevertheless, as the evidence discloses, without that right of final direction which would make him other than the clerk or agent of his employer, subject to dismissal at all times. This being so, he does not fall within the definition of one entitled to a certificate as a practising pharmacist."—*From the Pharmaceutical Record.*

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## MICHIGAN.

SUPREME COURT OF THE STATE OF MICHIGAN.

THE PEOPLE
*vs.*
EDWIN R. MOORMAN.

Filed July 3, 1891.

Morse, J. October 30, 1889, at the Village of Belding, in Ionia county, James H. Kinnane, employed by the State Board of Pharmacy to prosecute violations of the pharmacy law, went into the drug store of Spencer Bros., and asked for an half ounce of aloes and myrrh, which was furnished him by the respondent. Neither of the Spencer Bros. were present, nor was a registered pharmacist or a registered assistant pharmacist in the store at he time this tincture was put up. A short time afterward on the same day Kinnane again went into the store, and called for an ounce of tincture of iodine and one ounce of carbolic acid, the same being in the language of the record "drugs, medicines and poisons." The tinctures were put up for him by the respondent. Kinnane

afterward saw respondent and asked him if he was a registered pharmacist or registered assistant, and he said he was not; that he was a practicing physician, and registered as such, and considered that he had a right to dispense such drugs without being registered as a pharmacist, and that the laws of Michigan would protect him in so doing.

The Court refused to direct a verdict of not guilty, on these facts, upon a trial of the respondent, in the Ionia Circuit Court, upon appeal from Justice Court, where he was tried and convicted of violating the pharmacy law.

The respondent Moorman in his defense admitted the facts stated, and showed that he was a reputable physician of three years' practice, now registered in Ionia county; that he had ten years' experience as a pharmacist years ago; that he sold the drugs without any wilful intent to violate the law, but relying upon his right to do so, because of being a registered physician; that Kinnane was not his patient and he did not furnish him the drugs as a patient. He testified that any reputable physician should be able, and is able, to compound medicines and poisons and prepare his own prescriptions and, the prescriptions of any other physician; and that the sale of patent medicines is no part of the business of a practicing pharmacist. In this he was corroborated by the testimony of Henry Fremaysu, a practicing physician for fifteen years, residing at Ionia, who also testified that the tincture of iodine and carbolic acid was not used in coloring and in tanning.

Charles Thompson, a registered pharmacist, residing at Ionia, testified that the sale of patent medicines was not necessarily any part of the business of a pharmacist; that any one who could read could sell them as well as a person who had three years' experience, or any other term of years; that proprietary and patent medicines are usually kept in pharmacies. This is the substance of all the testimony.

The counsel for the respondent at the close of the evidence requested the Court to direct a verdict of not guilty on the ground that the law was unconstitutional and void. This request was refused and the Court instructed the jury that if they found that respondent sold the tincture of iodine and carbolic acid, and that the same were not used for coloring and tanning, then they should find a verdict of guilty. The jury returned a verdict of guilty, and the case came here upon exceptions before judgment.

It is admitted by the counsel for the defendant in his argument in this court that a law regulating the practice of pharmacy in this State is needed, and the right of the Legislature to pass such an act is not denied. The constitutionality of the present law is however attacked upon several grounds. We shall take them up in the order named in defendant's brief.

1. The law provides that no person shall vend patent or proprietary medicines by retail unless he has been in the business of vending and retailing such medicines three years or more. 3 How. Stat., § 2287, c. 8, p. 3204. It is claimed that the selling of such medicines is not necessarily any part of the business of a pharmacist. That the confining of the sale of patent medicines to pharmacists and retail dealers of three years' experience grants a monopoly to a favored few and for no adequate reason. And that it is also an object in the law not embraced in the title which reads, "An act to regulate the practice of pharmacy in the State of Michigan." See Hypophosphites and Borax cases, 42 N. W. R., 781 (Minn). There is much force in both these ohjections to this provision of the law; but it is not shown that the respondent was charged with vending patent or proprietary medicines, or that the drugs sold by him were such medicines. If this provision were eliminated from the act, it would have no effect whatever upon the conviction of the respondent, as the remainder of the act would not be invalidated thereby. Under the law as originally enacted in 1885, the sale of patent and proprietary medicines was expressly excepted from the act. In 1887 the law was amended so as to exempt only those retail dealers in these medicines who had sold them for three years or more. If this amendment should be declared unconstitutional, it would leave the law of 1885 in force.

2. It is claimed that the law authorizes the Pharmacy Board to fix the license fees arbitrarily, and to make a distinction in their discretion between different individuals.

We do not think the act is open to this objection. It is provided that, "The said Board may grant, under such rules and regulations as it may deem proper, at a fee not exceeding one dollar, the certificate of registered assistants, to clerks or assistants in pharmacy not less than 18 years of age." § 6, P. A., 1885, p. 135; 3 How. Stat., § 2287, c. 4.

Section 7 of the act provides for a yearly fee to be paid said Board, which shall not exceed one dollar for a pharmacist and fifty cents for an assistant, such registration fee to be fixed by the Board.

Neither of these sections contemplate that the Board may charge one person one cent and another one dollar, as contended by respondent's counsel. The fee must be uniform, applying to all persons of each class alike, and there is no evidence in the record that the practice of the Board has been otherwise.

3. The main objection to the act, and the only one which in this case concerns the respondent, is that the law deprives a registered physician of the right to compound, put up and sell drugs and medicines, which it must be considered from the nature of his profession he is thoroughly competent to do. It is also claimed that he has a vested right to do this which the Legislature cannot destroy. So much of the act as applies to physicians reads as follows: "Nothing in this act shall apply to or in any manner interfere with the business of any practicing physician, *who does not keep open shop for the retailing, dispensing or compounding of medicines and poisons*, or prevent him from supplying to his patients such articles as may seem to him proper." § 10, P. A., 1883, p. 136; 3 How. Stat., § 2287, c. 8, p. 3204.

Under this act if a physician wishes to keep open shop, or, in other words, a drug store, he must come under the same regulations as other persons, and he has no more right than any other person to step into a drug store and to compound or sell drugs, medicines or poisons to one not his patient. It may be that he is as competent to do this as a registered pharmacist or his registered assistant, but he has no vested right to do so. The law as I understand it does not interfere with him in the legitimate practice of his profession in which he is registered. If he wishes to do more than this he must comply with all the reasonable regulations of the Pharmacy Act.

The right to regulate the practice of pharmacy certainly rests upon as good reason and as sound principle as the right to regulate the practice of medicine. This latter right was sustained by this Court in People *vs.* Phippen, 70 Mich., 6, and in that case a law was upheld which must be said in its provisions to be more arbitrary and unreasonable than the one now before us. And in People *vs.* Pippen, *supra*, it was substantially held that no person, no matter how long he had been in the practice of his profession, had a vested right to practice medicine in Michigan. Consequently, a physician having no right to practice his own profession in the State unless registered and conforming to the regulations prescribed by the Legislature, cannot claim to have any vested right to compound or sell drugs and medicines to one not his patient, contrary to the will of the same body.

This must be now considered the settled law of this State. The question of the wisdom of such legislation is now relegated to the will of the people. The courts have no concern with it.

It is also claimed that the law is unconstitutional because it prohibits an assistant pharmacist, though registered, from owning or carrying on a drug store on his own account, or from managing a pharmacy. This is also a provision that does not concern the respondent in this case, and one which, if unconstitutional, would not destroy the balance of the act. It is not necessary, therefore, to express any opinion as to the validity of this prohibition.

The verdict of the jury must be sustained, and the Circuit Court of Ionia county is directed to proceed to judgment upon such verdict.

The other Justices concurred.

IN THE SUPREME COURT.

STATE OF MICHIGAN, *ss.* CLERK'S OFFICE.

I, Charles C. Hopkins, Clerk of the Supreme Court of the State of Michigan, do hereby certify that the annexed is a true and correct copy of the opinion of the Court now on file in said Court in said cause; that I have compared the same with the original, and that it is a true transcript therefrom, and the whole of said original.

[SEAL] *In testimony whereof*, I have hereunto set my hand and affixed the seal of said Supreme Court, at Lansing, this 15th day of July, A. D. 1891.

CHAS. C. HOPKINS,

*Clerk.*

# ENTERTAINMENTS AT THE FORTIETH ANNUAL MEETING.

Most of the members and delegates who attended this meeting followed the advice of the Local Secretary and the Committee on Arrangements, that Boston be considered the gathering point for those whose route of travel would permit.

On Saturday, July 9, the members began to arrive there, nearly all stopping at the Hotel Vendome, Commonwealth Avenue and Dartmouth street, where elegant quarters had been provided. A Committee on Entertainment and a number of special committees, representing the pharmacists and druggists of Boston and Massachusetts, took charge of the visiting members and their ladies, and were unremitting in their attentions. For Monday, July 11, excursions had been planned to Bunker Hill Monument and Charlestown, to Cambridge and Harvard University, to Concord, Lexington, Plymouth and Salem, each one being conducted by a special committee. Tuesday was set apart for a harbor excursion on the steamer *City of Jacksonville*, starting from Battery Wharf and landing at Bass Point, where a sumptuous fish dinner was served. Returning to the city shortly after noon, the remaining portion of the day was devoted to a carriage drive, starting from the Vendome at about 3 o'clock. Many places of interest in the city and suburbs were visited, and in the evening a delightful reception was tendered to the visitors at the Vendome, with music and refreshments, the company separating towards midnight. On the following morning, Wednesday, the journey to the place of meeting was undertaken in a special train, which landed the excursionists at Alton Bay on Lake Winnipesaukee, where a steamer was in waiting, with a committee of the New Hampshire pharmacists, who vied with their Massachusetts brethren in entertaining the visitors while on their way to the Profile House. Music had been provided, as well as an excellent luncheon and other enjoyments, and before the company disembarked at Weirs, President Finlay gave expression to the high appreciation of the constant courtesies shown, closing with a propositon for three cheers for the generous hosts, which was heartily endorsed, and ardently carried out. The last portion of the trip was made by rail through the Pemigewasset Valley to Bethlehem Junction, and thence to the Profile House, arriving there about supper time. The arrangements had been made with such foresight that, on arrival at the hotel, every one of the party found the baggage, which had been sent by a different route, already in the room assigned for his or her occupancy during the next five or six days.

During the days of their stay at the Profile House, the members visited the places of interest in the neighborhood. Within easy walking distance

is the "profile," a stone face formed on a spur of the mountain by three ledges of granite, nearly forty feet in height, and overlooking the placid Profile Lake, twelve hundred feet beneath it; and in the opposite direction Echo Lake. The Basin, Pool and Flume are distant four and six miles, and a vist to Sugar Hill requires a drive of about sixteen miles. Ascents of Mounts Lafayette and Cannon were also made by a number of the party. On three evenings readings were given by Professor Churchill, and music had been provided in the lobby or the parlors of the hotel afternoons and evenings.

On Tuesday morning, July 10, about one-half of the party left by rail at 7:30, visited Mount Washington, took dinner at the Summit House and then returned, passing the evening and night at the Crawford House. The remainder of the party started about three hours later, passed the night at Fabyan's, and reached the Crawford House on Wednesday morning. From here the ascent of Mount Willard was made, from the summit of which a grand view is had of Crawford Notch and the Upper Saco Valley. Dinner was provided at the Crawford House, the excursionists being the guests of Vermont druggists, Wells, Richardson & Co., Burlington, and after dinner the party left by rail, some returning to Boston, but the large majority, accepting the invitation extended by Maine, proceeded to Portland, arriving there early in the evening, and put up at the Falmouth, United States, Preble and other hotels. At the former of these an informal reception was held, at which many of the pharmacists, druggists, physicians and other citizens of Portland were present. The pharmacists of the city, joined by the Board of Trade and others, provided a carriage ride for Thursday morning, thus affording the visitors an opportunity for seeing the principal portions of the city and some of the suburbs. The drive terminated at a steamboat landing, where a steamer was in waiting to convey the visitors and their hosts on an excursion through the harbor and a part of Casco Bay, which is studded with a large number of islands, big and little. Finally, Long Island was reached, where a clam-bake was in progress and dinner was served. The return trip to the city was made in time to take the evening trains for Boston. But many preferred remaining in the hospitable city over night, while another large party secured state-rooms aboard the steamer *Portland* for a sea voyage to Boston during the evening and night. The latter city, which had been the gathering point of the party nearly two weeks earlier, became now the dividing point on the homeward trips.

Aside from the work done at the sessions, the meeting was a memorable one for the historical places visited, for the sublime scenery beheld, for its social features, and for the unbounded hospitality tendered by Massachusetts, New Hampshire, Vermont and Maine. But a shadow was cast at its close by the sudden removal of one of the party from among the living: Professor P. W. Bedford died July 20.

# LIST OF LIFE MEMBERS.

PUBLISHED IN ACCORDANCE WITH RESOLUTIONS OF THE COUNCIL. SEE PROCEEDINGS 1888, PAGE 41.

(Names of life members under old constitution in *Italics*, under present by-laws in SMALL CAPITALS.

*Abernethy, Maxwell.*
*Ash, Matthew F.*
*Baxley, J. Brown.*
BAXLEY, AUGUSTUS R.
*Berrian, George W.*
BIROTH, HENRY.
*Blatchford, Eben.*
*Bower, Henry.*
*Bullock, Charles.*
*Burnett, Joseph.*
CANNING, HENRY.
*Colcord, Samuel M.*
*Cummings, Henry T.*
CUTLER, EDWARD WALDO.
*Dearborn, George L.*
*Doliber, Thomas.*
DRURY, LINUS D.
*Du Puy, Eugene.*
EBERT, ALBERT E.
*Ellis, Evan T.*
FOUGERA, EDMOND C. H.
*Fox, Daniel S.*
FULLER, OLIVER F.
*Gale, Edwin O.*
*Gale, William H.*
*Gallagher, Charles K.*
*Goodwin, Wm. W.*
*Gordon, Wm. J. M.*
*Grahame, Israel J.*
*Haviland, Henry.*
*Hay, Henry H.*
HEINITSH, CHARLES A.
*Heintzelman, Joseph A.*
*Heyl, James B.*
HOLZHAUER, CHARLES.
*Hudnut, Alexander.*
JACQUES, GEORGE W.
*Jenks, Wm. J.*
JONES, EDWARD C.
JUDGE, JOHN F.
*Kent, Robert R.*
KESSLER, EDWARD F.
*Kidder, Samuel.*
KING, JAMES T.
KLUSSMANN, HERMANN.
LAND, ROBERT H.
*Leitch, Arthur.*
LEMBERGER, JOSEPH L.
MAISCH, JOHN M.
*McConville, Thomas A.*
*McPherson, George.*
*Mellor, Alfred.*
*Melvin, James S.*
*Metcalf, Theodore.*
MILBURN, JOHN A.
MILHAU, EDWARD L.
*Moffit, Thomas S.*
*Moith, Augustus T.*
*Molwitz, Ernest.*
*Newman, George A.*
*Niebrugge, John A.*
*Ollif, James H.*
ORNE, JOEL S.
*Paine, James D.*
*Parr, John C.*
*Patten, I. Bartlett.*
*Peabody, William H.*
*Perkins, Elisha H.*
*Perot, T. Morris.*
PFINGST, FERDINAND J.
*Rano, Charles O.*
REMINGTON, JOSEPH P.
*Rittenhouse, Henry N.*
ROBINSON, JAMES S.
*Rollins, John F.*
*Russell, Eugene J.*
SANDER, ENNO.
SEABURY, GEORGE J.

*Sharp, Alpheus P.*
SHEPPARD, SAMUEL A. D.
*Snyder, Ambrose C.*
*Steele, Henry.*
*Sweeny, Robert O.*
*Taylor, Alfred B.*
*Thompson, William B.*
TUFTS, CHARLES A.
*Turner, T. Larkin,*
*Vernor, James.*
*Wardell, Robert C.*
*Warner, Wm. R.*
WHITE, AARON S.
WHITFIELD, THOMAS.
*Wiegand, Thos. S.*
WINKELMANN, JOHN H.
WOLTERSDORF, LOUIS
YORSTON, MATTHEW M.
ZEILIN, J. HENRY.

# ALPHABETICAL LIST OF NAMES OF MEMBERS FROM WHOM MONEY HAS BEEN RECEIVED FOR ANNUAL DUES OR CERTIFICATES FROM JULY 1, 1891, TO JULY 1, 1892.

| | Annual Dues. | Certificates. |
|---|---|---|
| Abernethy, Maxwell.........'91 | $5 00 | |
| Acker, Philip..............'92 | 5 00 | |
| Ahlbrandt, Henry E.........'91 | 5 00 | |
| Aimar, Charles P.......'91–'92 | 10 00 | |
| Aird, William..........'91–'92 | 10 00 | |
| Alexander, Maurice W.......'91 | 5 00 | |
| Alfreds, Henry J...........'91 | 5 00 | |
| Allen, E. Floyd............'92 | 5 00 | |
| Alpers, William C......'91–'92 | 10 00 | |
| Anderson, Charles B........'91 | 5 00 | $5 00 |
| Anderson, Samuel...........'92 | 5 00 | |
| Andrews, Josiah H..........'92 | 5 00 | |
| Andriessen, Hugo...........'92 | 5 00 | |
| Armor, Alpheus.............'91 | 5 00 | |
| Armstrong, Andrew M........'91 | 5 00 | |
| Armstrong, George R........'91 | 5 00 | |
| Arnold, Charles F..........'92 | 5 00 | |
| Arny, Harry V..............'92 | 5 00 | |
| Aspinall, Walter A.........'91 | 5 00 | |
| Asplin, John H.............'91 | 5 00 | |
| Atwood, Herman W...........'92 | 5 00 | |
| Aubley, Samuel.............'91 | 5 00 | |
| Averill, William H.........'92 | 5 00 | |
| Ayer, Charles F........'91–'92 | 10 00 | |
| Bacon, Gaston E........'91–'92 | 10 00 | |
| Baier, Charles G...........'91 | 5 00 | |
| Bailey, Frederick..........'92 | 5 00 | |
| Baker, Edwin...............'92 | 5 00 | |
| Baker, T. Roberts..........'92 | 5 00 | |
| Ball, Charles E........'91–'92 | 10 00 | |
| Ballard, John W............'92 | 5 00 | |
| Balser, Gustavus...........'92 | 5 00 | |
| Baltzly, Albert B..........'91 | 5 00 | |
| Baridon, Louis R...........'92 | 5 00 | |
| Bartells, George C.........'91 | 5 00 | |
| Bartlet, William W.........'91 | 5 00 | |
| Bartlett, N. Gray..........'91 | 5 00 | |
| Bassett, Arthur........'91–'92 | 10 00 | |
| Bassett, Charles H.........'91 | 5 00 | |
| Bassett, Joseph............'91 | 5 00 | |
| Bauer, Louis G.............'91 | 5 00 | |
| Baur, Jacob................'91 | 5 00 | |
| Bayliss, Lewis F...........'91 | 5 00 | |
| Bayly, Charles A.......'91–'92 | 10 00 | |
| Beach, Clifton H...........'91 | 5 00 | |
| Beardmore, William A.......'91 | 5 00 | |
| Bechmann, Charles R........'92 | 5 00 | |
| Beckett, Frederick A...'91–'92 | 10 00 | |
| Beckmann, Oscar A..........'91 | 5 00 | |
| Beitenman, William W...'91–'92 | 10 00 | |
| Bell, John I...............'91 | 5 00 | |
| Bell, Samuel H.............'92 | 5 00 | |
| Bendiner, Samuel J.........'92 | 5 00 | |
| Benjamin, James H..........'91 | 5 00 | |
| Benton, Wilber M.......'91–'92 | 10 00 | |
| Berryhill, H. P............'92 | 5 00 | |
| Betz, Otto E...............'91 | 5 00 | |
| Betzler, Jacob.............'92 | 5 00 | |
| Beyschlag, Charles.........'92 | 5 00 | |
| Biddle, Herbert G..........'92 | 5 00 | |
| Amount carried forward....... | $355 00 | $5 00 |

| | Annual Dues. | Certificates. |
|---|---|---|
| Amount brought forward...... | $355 00 | $5 00 |
| Billings, Henry M..........'91 | 5 00 | |
| Bingham, Charles C.....'91–'92 | 10 00 | |
| Bishop, Francis M..........'91 | 5 00 | |
| Bissell, John G............'92 | 5 00 | |
| Black, John R..............'92 | 5 00 | |
| Blair, Henry C.............'91 | 5 00 | |
| Blake, James E.............'92 | 5 00 | |
| Blanding, William B........'91 | 5 00 | |
| Blank, Alois...............'91 | 5 00 | |
| Bley, Alphonso A. W........'92 | 5 00 | |
| Blocki, William F..........'92 | 5 00 | |
| Blumauer, Louis............'92 | 5 00 | |
| Bocking, Edmund............'91 | 5 00 | |
| Boehm, Solomon.............'91 | 5 00 | |
| Boerner, Emil L............'91 | 5 00 | |
| Boggs, Edwin L.............'91 | 5 00 | |
| Bond, John B...............'91 | 5 00 | |
| Bondurant, Charles S.......'91 | 5 00 | |
| Bossidy, Bartholomew.......'91 | 5 00 | |
| Bostick, Elmer E...........'91 | 5 00 | |
| Bower, Henry A.............'92 | 5 00 | |
| Bowron, Walter H...........'91 | 5 00 | |
| Boyce, Samuel F........'91–'92 | 10 00 | |
| Boyd, George W.........'91–'92 | 10 00 | |
| Boyden, Edward C.......'91–'92 | 10 00 | |
| Brackett, Aurick S.....'91–'92 | 10 00 | |
| Brand, Erich...............'92 | 5 00 | |
| Brewster, Wadsworth J......'92 | 5 00 | |
| Briggs, Andrew G...........'92 | 5 00 | |
| Bristol, Charles E.........'92 | 5 00 | |
| Broadus, T. Madison........'91 | 5 00 | |
| Brooks, Claude M...........'92 | 5 00 | |
| Brooks, Frederic P.....'91–'92 | 10 00 | |
| Brooks, George W...........'91 | 5 00 | |
| Brown, Albert P............'91 | 5 00 | |
| Brown, Henry J.............'91 | 5 00 | |
| Brown, James...............'91 | 5 00 | |
| Brown, Robert J............'91 | 5 00 | |
| Bruce, James...............'91 | 5 00 | |
| Bruck, Philip H............'92 | 5 00 | |
| Bruguier, Francis..........'92 | 5 00 | |
| Brundage, Fred.............'91 | 5 00 | |
| Brunner, Norman I..........'91 | 5 00 | |
| Brunswig, Lucien N.........'91 | 5 00 | |
| Buck, John.................'91 | 5 00 | |
| Buck, John L...............'91 | 5 00 | |
| Buehler, John J............'91 | 5 00 | |
| Bunker, Elihu..............'92 | 5 00 | |
| Bunting, Lindsay...........'92 | 5 00 | |
| Burg, John D...............'91 | 5 00 | |
| Burge, James O.............'91 | 5 00 | |
| Burkhardt, Mark A..........'91 | 5 00 | |
| Burnham, Alfred A., Jr.....'92 | 5 00 | |
| Burnham, Edward S......'91–'92 | 10 00 | |
| Burns, J. Kellar...........'91 | 5 00 | |
| Burrough, Horace...........'92 | 5 00 | |
| Bush, William..............'92 | 5 00 | |
| Butler, Charles H..........'92 | 5 00 | |
| Butler, Freeman H..........'92 | 5 00 | |
| Amount carried forward....... | $685 00 | $5 00 |

| | Annual Dues. | Certificates. |
|---|---|---|
| Amount brought forward...... | $685 00 | $5 00 |
| Button, Charles E...........'92 | 5 00 | |
| Calder, Albert L. ............'91 | 5 00 | |
| Calvert, John ............'91-'92 | 10 00 | |
| Carrell, Eugene A............'91 | 5 00 | |
| Carslake, George M..........'92 | 5 00 | |
| Carter, Frank H..........'91-'92 | 10 00 | |
| Carter, Solomon..............'91 | 5 00 | |
| Carver, Frank H.............'92 | 5 00 | |
| Caspari, Charles, Jr..........'92 | 5 00 | |
| Casper, Thomas J............'92 | 5 00 | |
| Catlin, Ephron..............'91 | 5 00 | |
| Chalin, Louis F. .............'91 | 5 00 | |
| Chandler, Charles F........ .'92 | 5 00 | |
| Chapin, Fred. H. ............'91 | 5 00 | |
| Chapin, Wm. A...............'92 | 5 00 | |
| Chapman, Isaac C...........'92 | 5 00 | |
| Charroppin, Emile L.........'92 | 5 00 | |
| Choate, John ................'92 | 5 00 | |
| Christiani, Charles .......'91-'92 | 10 00 | |
| Clapp, George H.............'91 | 5 00 | |
| Clark, John A. ..............'91 | 5 00 | |
| Clarke, Louis G.............'91 | 5 00 | |
| Cobb, Ralph L...............'91 | 5 00 | |
| Coblentz, Virgil .............'92 | 5 00 | |
| Cole, Charles M. ............'91 | 5 00 | |
| Cole, Howson W.............'92 | 5 00 | |
| Cole, Victor L ...............'92 | 5 00 | |
| Colgan, John ................'91 | 5 00 | |
| Collins, Albert B.............'92 | 5 00 | |
| Colton, James B. ............'91 | 5 00 | |
| Cone, John W. ..............'92 | 5 00 | |
| Connor, L. Myers ...........'91 | 5 00 | 2 50 |
| Conrath, Adam ..............'92 | 5 00 | |
| Cook, Gilbert S..............'91 | 5 00 | |
| Cook, Thomas P.............'92 | 5 00 | |
| Cornell, Edward A...........'91 | 5 00 | |
| Cotton, William H...........'92 | 5 00 | |
| Cowdin, George H...........'92 | 5 00 | |
| Craighill, Ed. A..............'92 | 5 00 | |
| Cramer, Max................'92 | 5 00 | |
| Crawford, Walter B., Jr.......'92 | 5 00 | |
| Crona, Sixtus E. S. ..........'91 | 5 00 | |
| Croom, James D.............'91 | 5 00 | |
| Crossman, George A. ........'92 | 5 00 | |
| Culbreth, David M. R........'91 | 5 00 | |
| Culver, Anson A.............'92 | 5 00 | |
| Cummings, Theodore F.......'91 | 5 00 | |
| Cummins, J. Wirt............'91 | 5 00 | |
| Curtman, Charles O..........'91 | 5 00 | |
| Cushman, Henry C...........'91 | 5 00 | |
| Cutts, Foxwell C., Jr.....'91-'92 | 10 00 | |
| Dadd, John A ...............'92 | 5 00 | |
| Dana, Edmund, Jr. ..........'91 | 5 00 | |
| Danforth, Edmund C.........'91 | 5 00 | |
| Dare, Charles F..............'91 | 5 00 | |
| Daubach, Charles J. .........'91 | 5 00 | |
| Davies, Llewellyn P. ........'92 | 5 00 | 5 00 |
| D'Avignon, J. Eugene .......'92 | 5 00 | |
| Davis, George R.............'91 | 5 00 | |
| Davis, Theo. G. .............'92 | 5 00 | |
| Davis, William M............'91 | 5 00 | |
| Dawson, Edward S., Jr.......'91 | 5 00 | |
| Dawson, John H. ........'91-'92 | 10 00 | |
| De Forest, Wm. P. ..........'91 | 5 00 | |
| De Graff, David .............'91 | 5 00 | |
| De Lang, Alfred .............'91 | 5 00 | |
| De Lorenzi, Albert .......'91-'92 | 10 00 | |
| Dedrick, Wm. F. ............'91 | 5 00 | |
| Deibert, Thomas I...........'91 | 5 00 | |
| Dejan, J. B. Geo.............'92 | 5 00 | |
| Delouest, Edward............'92 | 5 00 | |
| Dennin, Charles..........'91-'92 | 10 00 | |
| Deutsch, Julius W. ..........'91 | 5 00 | |
| Devine, John ............'91-'92 | 10 00 | |
| Dewoody, William L. ........'92 | 5 00 | |
| Amount carried forward ...... | $1100 00 | $12 50 |

| | Annual Dues. | Certificates. |
|---|---|---|
| Amount brought forward...... | $1100 00 | $12 50 |
| Diehl, C. Lewis..............'91 | 5 00 | |
| Dietrick, H. Dickson ........'91 | 5 00 | |
| Dill, J. Byron............'91-'92 | 10 00 | |
| Dilly, Oscar C. ..............'91 | 5 00 | |
| Dimock, Robert H. ..........'92 | 5 00 | |
| Ditman, Andrew J. ..........'92 | 5 00 | |
| Dobbins, Edward T..........'92 | 5 00 | |
| Dodd, Simon W.............'91 | 5 00 | |
| Dohme, Alfred R. L..........'92 | 5 00 | |
| Dohme, Chas. E..........'91-'92 | 10 00 | |
| Dohme, Louis............'91-'92 | 10 00 | |
| Dolan, Frank L..............'92 | 5 00 | |
| Donaldson, Pierre A..........'92 | 5 00 | |
| Dougherty, Samuel E. .......'91 | 5 00 | |
| Douglas, Henry, Jr. .........'91 | 5 00 | |
| Downing, Benjamin F., Jr....'91 | 5 00 | |
| Drake, Charles W. .......'91-'92 | 10 00 | |
| Drake, John R...............'92 | 5 00 | |
| Dreher, Louis ...............'91 | 5 00 | |
| Dresser, Geo. E.............'91 | 5 00 | |
| Driggs, Charles M. ..........'91 | 5 00 | |
| Drury, John S. ..............'91 | 5 00 | |
| Duble, Jesse B...............'91 | 5 00 | |
| Du Bois, Wm. L.............'92 | 5 00 | |
| Duckert, Louis A.............. | ....... | 5 00 |
| Duckett, Walter G. ......'91-'92 | 10 00 | |
| Dunn, John A...........'91-'92 | 10 00 | |
| Dunwody, Richard G. .......'91 | 5 00 | |
| Dupont, William.............'91 | 5 00 | |
| Durkee, William C...........'92 | 5 00 | |
| Earl, Charles ................'92 | 5 00 | |
| Ebbitt, William H. .......'91-'92 | 10 00 | |
| Eberbach, Ottmar............'92 | 5 00 | |
| Eberhardt, Ernest G. ........'91 | 5 00 | |
| Eberle, Chas. L. .............'91 | 5 00 | |
| Eccles, Robert G. ........'91-'92 | 10 00 | |
| Eckel, Augustus W. ......'91-'92 | 10 00 | |
| Eddy, Henry C. .............'91 | 5 00 | |
| Edie, John B.................'91 | 5 00 | |
| Edwards, Nathan W. ........'91 | 5 00 | |
| Eger, George ................'91 | 5 00 | |
| Ekman, N. Adolf ............'91 | 5 00 | |
| Elbe, Constantine B..........'92 | 5 00 | |
| Elliott, Henry A. ............'92 | 5 00 | |
| Emich, Columbus V..........'92 | 5 00 | |
| Eschman, Clemens L.........'91 | 5 00 | |
| Estabrook, Henry A......'91-'92 | 10 00 | |
| Estes, Joseph J. .............'92 | 5 00 | |
| Evans, Joseph S. ............'92 | 5 00 | |
| Evans, Samuel B.............'91 | 5 00 | |
| Ewing, Frederic C. ..........'91 | 5 00 | |
| Eyssell, George..............'91 | 5 00 | |
| Fahlen, Julius ...............'91 | 5 00 | |
| Fairchild, Benjamin T........'92 | 5 00 | |
| Fairchild, Samuel W. ........'92 | 5 00 | |
| Farlow, John B. .............'91 | 5 00 | |
| Fay, Hamilton...............'91 | 5 00 | |
| Feemster, Joseph H..........'91 | 5 00 | |
| Feil, Joseph .................'91 | 5 00 | |
| Fennel, Charles T. P. ........'92 | 5 00 | |
| Fenner, Alexander W. .......'91 | 5 00 | |
| Field, Claud ............'91-'92 | 10 00 | |
| Fink, Frederick W. ..........'92 | 5 00 | |
| Finley, Ardon C. ............'91 | 5 00 | |
| Finley, Norval H.........'90-'91 | 10 00 | |
| Fischer, Henry J............'91 | 5 00 | |
| Fischer, Phil.................'91 | 5 00 | |
| Fisher, William..............'91 | 5 00 | |
| Flanagan, Lewis C...........'92 | 5 00 | |
| Fleck, Jacob J. ..............'92 | 5 00 | |
| Fleischer, Adolph T..........'91 | 5 00 | |
| Fleischmann, Augustus T.'90-'91 | 10 00 | |
| Flint, George B. .............'92 | 5 00 | |
| Flint, John H.................'92 | 5 00 | |
| Ford, Charles M..........'91-'92 | 10 00 | |
| Amount carried forward ...... | $1540 00 | $17 50 |

| | Annual Dues. | Certificates. |
|---|---|---|
| Amount brought forward | $1540 00 | $17 50 |
| Ford, Herbert L. '91 | 5 00 | |
| Ford, W. Thomas '91 | 5 00 | |
| Foster, Wm. O. '91 | 5 00 | |
| Foulke, James '91–'92 | 10 00 | |
| Fowler, Jos. W. '91 | 5 00 | |
| Fox, Peter P. '91 | 5 00 | |
| Frames, J. Fuller '91–92 | 10 00 | |
| Franklin, Philip H. '91 | 5 00 | |
| Fraser, Horatio N. '92 | 5 00 | |
| Fraser, Robert P. '90–'91 | 10 00 | |
| Frauer, Herman E. '91–'92 | 10 00 | |
| French, Harry B. '92 | 5 00 | |
| Frere, Alexander G. '91 | 5 00 | |
| Frohwein, Richard '91 | 5 00 | |
| Fruh, Carl D. S. '91 | 5 00 | |
| Frye, George C. '92 | 5 00 | |
| Galt, Edward P. '91 | 5 00 | |
| Gammon, Irving P. '91 | 5 00 | |
| Gates, Howard E. '92 | 5 00 | |
| Gayle, John W. '92 | 5 00 | |
| Gaylord, Henry C. '91 | 5 00 | |
| Gayner, John N. '91 | 5 00 | |
| Gegelein, Frederick L. '92 | 5 00 | |
| Geier, Oscar W. '91 | 5 00 | |
| Gerhard, Samuel '91 | 5 00 | |
| Gessner, Emil A. '92 | 5 00 | |
| Gibson, James E. '91 | 5 00 | |
| Gibson, John S. '91 | 5 00 | 7 50 |
| Gilbert, Chas. A. '91 | 5 00 | |
| Gill, George '92 | 5 00 | |
| Gilpin, Henry B. '91 | 5 00 | |
| Girling, Robert N. '92 | 5 00 | |
| Glines, George W. '92 | 5 00 | |
| Glover, Wm. H. '91 | 5 00 | 5 00 |
| Godbold, Fabius C. '92 | 5 00 | |
| Godding, Edward R. '91 | 5 00 | |
| Godding, John G. '92 | 5 00 | |
| Good, James M. '91 | 5 00 | |
| Goodale, Harvey G. '92 | 5 00 | |
| Goodman, Emanuel '91 | 5 00 | |
| Goodrich, Stephen '91 | 5 00 | |
| Goodwill '92 | 5 00 | |
| Goodwin, Eugene R. '91 | 5 00 | |
| Goodwin, Lester H. '91 | 5 00 | |
| Gorgas, George A. '92 | 5 00 | |
| Gosman, Adam J. '92 | 5 00 | |
| Grambois, Augustin '92 | 5 00 | |
| Grandjean, Charles '91 | 5 00 | |
| Grandjean, Eugene '91 | 5 00 | |
| Graner, William '92 | 5 00 | |
| Gray, Gilbert D. '91 | 5 00 | |
| Gray, Henry R. '91 | 5 00 | |
| Gray, William H. '91 | 5 00 | |
| Green, Arthur L. '92 | 5 00 | |
| Green, Benjamin '91 | 5 00 | |
| Green, Robert M. '91 | 5 00 | |
| Greene, Wm. R. '91–'92 | 10 00 | |
| Gregory, Willis G. '91 | 5 00 | |
| Greve, Theodore L. A. '92 | 5 00 | |
| Greyer, Julius '92 | 5 00 | |
| Griffith, Albert R. | ....... | 3 75 |
| Gross, Edward Z. '91 | 5 00 | |
| Grosskiaus, John F. '92 | 5 00 | |
| Grosvenor, Daniel P., Jr. '91 | 5 00 | |
| Gutierrez, Antonio G. '91 | 5 00 | |
| Haass, G. Herman '92 | 5 00 | |
| Hadley, Frank R. '91–'92 | 10 00 | |
| Haenchen, Chas. E. '91 | 5 00 | |
| Haeusgen, H. Otto '91 | 5 00 | |
| Hahn, Sigismund J. F. '91 | 5 00 | |
| Hall, Chas. E. '91 | 5 00 | |
| Hall, Edwin B. '92 | 5 00 | |
| Hall, Wm. A. '91 | 5 00 | |
| Hallberg, Carl S. N. '91 | 5 00 | |
| Halleck, Wm. E. '91–'92 | 10 00 | |
| Amount carried forward | $1945 00 | $33 75 |

| | Annual Dues. | Certificates. |
|---|---|---|
| Amount brought forward | $1945 00 | $33 75 |
| Hance, Edward H. '92 | 5 00 | |
| Hancock, Charles W. '92 | 5 00 | |
| Hancock, Franklin W. '91 | 5 00 | |
| Hancock, John F. '91 | 5 00 | |
| Hancock, J. Henry '91 | 5 00 | |
| Hanson, Arthur E. '91 | 5 00 | |
| Hardigg, Wm. L. '91 | 5 00 | |
| Hardin, John H. '91 | 5 00 | |
| Hardy, Cyrus D. '91 | 5 00 | |
| Harlow, Noah S. '92 | 5 00 | |
| Harper, Harry W. '91 | 5 00 | |
| Harrington, Frank '91 | 5 00 | |
| Harrison, Jacob H. '92 | 5 00 | |
| Hartshorn, Frederick A. '92 | 5 00 | |
| Harvey, John M. '91 | 5 00 | |
| Hassebrock, Henry F. '91 | 5 00 | |
| Hassinger, Samuel E. R. '92 | 5 00 | |
| Hastings, Benjamin '91 | 5 00 | |
| Hattennauer, Robert C. '92 | 5 00 | |
| Hatton, Edgar M. '92 | 5 00 | |
| Hauenstein, Wm. '92 | 5 00 | |
| Haussamen, Henry L. '91 | 5 00 | |
| Hawkins, M. Smith '92 | 5 00 | |
| Hay, Edward A. '91–'92 | 10 00 | |
| Hayes, Horace P. '91 | 5 00 | |
| Hayhurst, Susan '92 | 5 00 | |
| Hays, B. Frank '92 | 5 00 | |
| Hays, David '92 | 5 00 | |
| Hechler, George L. '92 | 5 00 | |
| Hegeman, J. Niven '91 | 5 00 | |
| Heinemann, Otto '91 | 5 00 | |
| Helke, William L. '92 | 5 00 | |
| Hemm, Francis '91 | 5 00 | |
| Henderson, Archibald K. '92 | 5 00 | |
| Hening, James C. '91 | 5 00 | |
| Henry, Charles (Dworniczak) '92 | 5 00 | |
| Hepburn, John '91 | 5 00 | |
| Herbst, Frederick W. '92 | 5 00 | |
| Hermann, John G. '91 | 5 00 | |
| Heydenreich, Emile '91 | 5 00 | |
| Higgins, James S. '92 | 5 00 | |
| Hilby, Francis M. '91 | 5 00 | |
| Hildreth, Newton G. '91 | 5 00 | |
| Hill, Justin L. '91 | 5 00 | |
| Hilt, David '91 | 5 00 | |
| Hilton, Samuel L. '92 | 5 00 | |
| Hiriart, Sebastian '92 | 5 00 | |
| Hodges, J. Walter '92 | 5 00 | |
| Hodgkins, Bert W. '91–'92 | 10 00 | |
| Hoenny, Adolph J. '91 | 5 00 | |
| Hoffman, Otto L. '92 | 5 00 | |
| Hoffmann, Frederick '93 | 5 00 | |
| Hogey, Julius H. '91 | 5 00 | |
| Hohenthal, Charles F. L. '91 | 5 00 | |
| Hohley, Charles '91–'92 | 10 00 | |
| Holden, Isaac D. '92 | 5 00 | |
| Holland, Samuel S. '92 | 5 00 | |
| Hollister, Albert H. '92 | 5 00 | |
| Holmes, Clay W. '92 | 5 00 | |
| Holt, Alvin E. '91 | 5 00 | |
| Homer, John '91 | 5 00 | |
| Hood, Charles I. '92 | 5 00 | |
| Hood, John W. | ....... | 5 00 |
| Hopp, Lewis C. '91–'92 | 10 00 | |
| Horn, Wilbur F. '91–'92 | 10 00 | |
| Houghton, Harry J. '91–'92 | 10 00 | |
| Howson, Arthur B. '92 | 5 00 | |
| Howson, Walter H. '92 | 5 00 | |
| Hoyt, George M. '90–'91 | 10 00 | |
| Hubbard, John H. '92 | 5 00 | |
| Hudson, Arthur '91 | 5 00 | |
| Huecker, John '91 | 5 00 | |
| Hughes, George '91 | 5 00 | |
| Huhn, George '91 | 5 00 | |
| Hulting, Fred. B. '91–'92 | 10 00 | |
| Amount carried forward | $2355 00 | $38 75 |

| | Annual Dues. | Certificates. |
|---|---|---|
| Amount brought forward | $2355 00 | $38 75 |
| Hunt, Denis D. '91 | 5 00 | |
| Huntington, Wm. H. '92 | 5 00 | |
| Hurty, John N. '91–'92–'93 | 15 00 | |
| Huston, Charles '92 | 5 00 | |
| Hutchins, Isaiah '92 | 5 00 | |
| Hutton, Harry D. '91–'92 | 10 00 | |
| Hyler, William H. '90–'91 | 10 00 | |
| Hynson, Henry P. '91–'92 | 10 00 | |
| Ihlefeld, Conrad H. '92 | 5 00 | |
| Illsley, Geo. W. B. '91–'92 | 10 00 | |
| Ingalls, Albert O. '91 | 5 00 | |
| Ingalls, John '91 | 5 00 | |
| Inglis, Frank '91 | 5 00 | |
| Ink, Charles E. '91 | 5 00 | |
| Inman, Charles T. '91 | 5 00 | |
| Irvin, William A. '92 | 5 00 | |
| James, Frank L. '91 | 5 00 | |
| James, William T. '91 | 5 00 | |
| Jenkins, Luther L. '91–'92 | 10 00 | |
| Jennings, N. Hynson '91 | 5 00 | |
| Jesson, Jacob '91 | 5 00 | |
| Joergensen, Sophus '91–'92 | 10 00 | |
| Johnson, Arthur S. '91 | 5 00 | |
| Johnson, Chas. B. '92 | 5 00 | |
| Johnston, Harry A. '91–'92 | 10 00 | |
| Jones, Alexander H. '92 | 5 00 | |
| Jones, Daniel S. '91 | 5 00 | |
| Jones, James T. '91–'92 | 10 00 | |
| Jones, John, Jr. '92 | 5 00 | |
| Jones, Samuel S. '91 | 5 00 | |
| Jones, Simon N. '91 | 5 00 | |
| Jordan, Francis '91 | 5 00 | |
| Joy, Edwin W. '92 | 5 00 | |
| Judisch, George '91 | 5 00 | |
| Jungkind, John A. '91 | 5 00 | |
| Jungmann, Julius '91–'92 | 10 00 | |
| Kalish, Julius '92 | 5 00 | |
| Kalusowski, Henry E. '92 | 5 00 | |
| Karb, Geo. J. '92 | 5 00 | |
| Karrmann, William '91 | 5 00 | |
| Kauffman, George B. '92 | 5 00 | |
| Kearfott, Clarence P. '91 | 5 00 | |
| Keefer, Chas. D. '92 | 5 00 | |
| Keene, Thomas R. '91 | 5 00 | |
| Keil, Fred. C. '91–'92 | 10 00 | |
| Keller, Fred. P. P. '91 | 5 00 | |
| Kelley, Edward S. '92 | 5 00 | |
| Kellogg, Gardner '91–'92 | 10 00 | |
| Kelly, George A. '92 | 5 00 | |
| Kemp, Edward '92 | 5 00 | |
| Kennedy, Ewen C. '91 | 5 00 | |
| Kennedy, Ezra J. '91 | 5 00 | |
| Kennedy, George W. '91–'92 | 10 00 | |
| Kerr, Frank G. '91 | 5 00 | |
| Kerr, William W. '91 | 5 00 | |
| Kieffer, George '91 | 5 00 | |
| Kienth, Hans '92 | 5 00 | |
| Kilbourne, Lewis P. '92 | 5 00 | |
| Kilmer, Frederick B. '91 | 5 00 | |
| Kirchgasser, Wm. C. '92 | 5 00 | |
| Kirchhofer, Paul '91 | 5 00 | |
| Kirkland, Derwentwater '91 | 5 00 | |
| Klauber, Chas. N. '92 | 5 00 | |
| Klayer, Louis '91 | 5 00 | |
| Kleinschmidt, Augustus A. '91 | 5 00 | |
| Klie, G. H. Charles '91 | 5 00 | |
| Kline, Chas. S. '92 | 5 00 | |
| Kline, Mahlon N. '92 | 5 00 | |
| Knabe, Gustavus A. '91 | 5 00 | |
| Knock, Thomas F. '92 | 5 00 | |
| Knoefel, August '91 | 5 00 | |
| Koch, Louis '92 | 5 00 | |
| Kochan, John '91 | 5 00 | |
| Koehnken, Herman H. '91 | 5 00 | |
| Koles, Samuel M. '92 | 5 00 | |
| Amount carried forward | $2800 00 | $38 75 |

| | Annual Dues. | Certificates. |
|---|---|---|
| Amount brought forward | $2800 00 | $38 75 |
| Kostitch, Stephen T. '91–'92 | 10 00 | |
| Kostka, Bruno O. '92 | 5 00 | |
| Krehe, J. Theodor '92 | 5 00 | |
| Kremers, Edward '91–'92 | 10 00 | |
| Krewson, Wm. E. '91 | 5 00 | |
| Krieger, Philip '91–'92 | 10 00 | |
| Krosskop, Wm. B. '92 | 5 00 | |
| Kuhlmeier, Henry '91 | 5 00 | |
| Kurfurst, Henry F. '92 | 5 00 | |
| Lachance, Seraphin '92 | 5 00 | |
| Lahme, Chas. A. '91 | 5 00 | |
| Laing, Alfred A. '92 | 5 00 | |
| Lammert, C. Joseph '92 | 5 00 | |
| Lander, John C. '91–'92 | 10 00 | |
| Last, Louis '92 | 5 00 | |
| Lavigne, Jean B. '92 | 5 00 | |
| Lawton, Charles H. '92 | 5 00 | |
| Lawton, Horace A. '92 | 5 00 | |
| Lazell, Lewis T. '91 | 5 00 | |
| Legendre, Joseph A. '91 | 5 00 | |
| Lehn, Louis '91–'92 | 10 00 | |
| Lehr, Philip '91–'92 | 10 00 | |
| Leis, George '91 | 5 00 | |
| Leist, Jacob L. '91–'92 | 10 00 | |
| Leonardi, Sydney B. '91 | 5 00 | |
| Leonhard, Rudolph E. | ....... | 7 50 |
| Lernhart, August '92 | 5 00 | |
| Libby, Henry F. '89–'90–'91 | 15 00 | |
| Lilly, Eli '91–'92 | 10 00 | |
| Lilly, Josiah K. '91–'92 | 10 00 | |
| Livingston, Barent V. B. '91–'92 | 10 00 | |
| Llewellyn, John F. '91 | 5 00 | |
| Lloyd, John U. '92 | 5 00 | |
| Lockhart, George B. '91–'92 | 10 00 | |
| Loehr, Theodore C. '90–'91 | 10 00 | |
| Loomis, John C. '92 | 5 00 | |
| Lord, Frank J. '92 | 5 00 | |
| Lord, Thomas '92 | 5 00 | |
| Lowd, John C. '92 | 5 00 | |
| Lowden, John '91–'92 | 10 00 | |
| Ludlow, Charles '91 | 5 00 | |
| Luscomb, William E. '91 | 5 00 | |
| Lyman, Asahel H. '91 | 5 00 | |
| Maclagan, Henry '91 | 5 00 | |
| Maisch, Henry C. C. '91 | 5 00 | |
| Majer, Oscar '91 | 5 00 | |
| Major, John R. '91–'92 | 10 00 | |
| Mallinckrodt, Edward '91 | 5 00 | |
| Mann, Albert '92 | 5 00 | |
| Manning, John H. '91 | 5 00 | |
| Markoe, George F. H. '92 | 5 00 | |
| Marshall, Ernest C. '92 | 5 00 | |
| Marsteller, George L. '91–'92 | 10 00 | |
| Martin, John C. '91–'92 | 10 00 | |
| Martin, Nicholas H. '92 | 5 00 | |
| Martin, S. Robert '91 | 5 00 | |
| Massey, Wm. M. '91 | 5 00 | |
| Masters, Robert S. '90–'91 | 10 00 | |
| May, Arthur F. '91 | 5 00 | |
| May, James O. '92 | 5 00 | |
| McDonald, George '91 | 5 00 | |
| McElhenie, Thomas D. '91 | 5 00 | |
| McElwee, Emer J. '91–'92 | 10 00 | |
| McIntyre, Byron F. '90–'91 | 10 00 | |
| McIntyre, Ewen '91 | 5 00 | |
| McIntyre, William '92 | 5 00 | |
| McKelway, George I. '91 | 5 00 | |
| McKesson, John, Jr. '92 | 5 00 | |
| McNeil, John M. '92 | 5 00 | |
| Meissner, Paul E. '92 | 5 00 | |
| Melvin, Samuel H. '91 | 5 00 | |
| Menkemeller, Charles '91 | 5 00 | |
| Mennen, Gerhard '92 | 5 00 | |
| Merrell, Ashbel H. '91 | 5 00 | |
| Merrell, Charles G. '92 | 5 00 | |
| Amount carried forward | $3275 00 | $46 25 |

| | Annual Dues | Certificates. |
|---|---|---|
| Amount brought forward...... | $3275 00 | $46 25 |
| Merrell, George..............'92 | 5 00 | |
| Meyer, Christian F. G........'91 | 5 00 | |
| Miller, Adolph W............'92 | 5 00 | |
| Miller, Charles G............'91 | 5 00 | |
| Miller, Jacob A.........'91-'92 | 10 00 | |
| Miller, James M.............'91 | 5 00 | |
| Miller, Jason A.............'92 | 5 00 | |
| Miller, Joseph G............'91 | 5 00 | |
| Milligan, Decatur.........'91-'92 | 10 00 | |
| Mittelbach, William..........'92 | 5 00 | |
| Miville, Francis C...........'91 | 5 00 | |
| Moody, Richard H...........'91 | 5 00 | |
| Moore, George...............'92 | 5 00 | |
| Moore, John T...............'92 | 5 00 | |
| Moore, Josh. F...............'92 | 5 00 | |
| Moore, Thomas F............'91 | 5 00 | |
| More, Arthur J...........'91-'92 | 10 00 | |
| Morgan, Aylmer L..........'92 | 5 00 | |
| Morley, Wm. J..............'91 | 5 00 | |
| Morrison, Joseph E..........'91 | 5 00 | |
| Morse, C. Milan..........'91-'92 | 10 00 | |
| Moulton, Daniel P...........'92 | 5 00 | 5 00 |
| Mowry, Albert D............'92 | 5 00 | |
| Mueller, Adolph.............'92 | 5 00 | |
| Mueller, Otto E..............'91 | 5 00 | |
| Munson, James H............'91 | 5 00 | |
| Munson, Luzerne I...........'91 | 5 00 | |
| Myers, Daniel...............'92 | 5 00 | |
| Nattans, Arthur..........'91-'92 | 10 00 | |
| Neppach, Stephen A.........'91 | 5 00 | |
| Newbold, Thomas M.........'91 | 5 00 | |
| Newman, George A..........'91 | 5 00 | |
| Nichols, John C..........'91-'92 | 10 00 | |
| Nichols, Thomas B...........'91 | 5 00 | |
| Nicholson, Wm. S............'91 | 5 00 | |
| Nipgen, John A..............'92 | 5 00 | |
| Nisbet, Wm. W..............'91 | 5 00 | |
| Noll, Matthias...............'92 | 5 00 | |
| Norton, Edward B............'91 | 5 00 | |
| O'Brien, James J.............'91 | 5 00 | |
| O'Hare, James...........'91-'92 | 10 00 | |
| O'Neil, Henry M.........'91-'92 | 10 00 | |
| Oberdeener, Samuel..........'92 | 5 00 | |
| Oglesby, George D...........'91 | 5 00 | |
| Ohliger, Lewis P.............'91 | 5 00 | |
| Oleson, Olaf M..............'92 | 5 00 | |
| Oliver, Wm. M..............'92 | 5 00 | |
| Orton, Ingomar F............'92 | 5 00 | 5 00 |
| Osgood, Hugh H.............'92 | 5 00 | |
| Osmun, Charles A............'92 | 5 00 | |
| Otis, Clark Z................'91 | 5 00 | |
| Ottinger, James J............'92 | 5 00 | |
| Owens, James A.............'92 | 5 00 | |
| Owens, Richard J........'91-'92 | 10 00 | |
| Panknin, Chas. F.........'91-'92 | 10 00 | |
| Parcher, George A...........'92 | 5 00 | |
| Parker, George H........'91-'92 | 10 00 | |
| Parkill, Stanley E............'91 | 5 00 | |
| Parrott, John E..............'91 | 5 00 | |
| Parsons, John...............'92 | 5 00 | |
| Patch, Edgar L..............'92 | 5 00 | |
| Patterson, Theodore H.......'91 | 5 00 | |
| Patton, John F...............'92 | 5 00 | |
| Pauley, Frank C.............'91 | 5 00 | |
| Pease, Francis M............'92 | 5 00 | |
| Peck, George L..............'92 | 5 00 | |
| Perkins, Benjamin A.........'92 | 5 00 | |
| Perkins, Wm A..............'92 | 5 00 | |
| Perry, Frederick W. R.......'91 | 5 00 | |
| Pettengill, Edward T.........'91 | 5 00 | |
| Pettit, Henry M..........'91-'92 | 10 00 | |
| Peyton, Robert D............'91 | 5 00 | |
| Pfingst, Edward C............'91 | 5 00 | |
| Pfingst, Henry A.............'91 | 5 00 | |
| Pfingsten, Gustav........'91-'92 | 10 00 | |
| Amount carried forward....... | $3715 00 | $56 25 |

| | Annual Dues. | Certificates. |
|---|---|---|
| Amount brought forward...... | $3715 00 | $56 25 |
| Pfunder, William............'91 | 5 00 | |
| Phelps, Dwight...........'91-'92 | 10 00 | |
| Phillips, Charles W...........'92 | 5 00 | |
| Phillips, Edwin F............'92 | 5 00 | |
| Physick, Henry S............'91 | 5 00 | |
| Pickett, John H..............'92 | 5 00 | |
| Pieck, Edward L.............'91 | 5 00 | |
| Pierce, Wm H............'91-'92 | 10 00 | |
| Pile, Gustavus...............'92 | 5 00 | |
| Pitt, John R., Jr.............'92 | 5 00 | |
| Pleasants, Chas. H...........'92 | 5 00 | |
| Plummer, David G...........'91 | 5 00 | |
| Porter, Chilton S.............'91 | 5 00 | |
| Porter, Henry C.............'91 | 5 00 | |
| Post, Elisha.................'92 | 5 00 | |
| Powell, Robert B............'92 | 5 00 | |
| Powell, Thomas W...........'91 | 5 00 | |
| Prall, Delbert E..............'92 | 5 00 | |
| Prentice, Fred. F............'91 | 5 00 | |
| Prescott, Albert B............'91 | 5 00 | |
| Prescott, Horace A...........'91 | 5 00 | |
| Preston, Andrew P...........'92 | 5 00 | |
| Preston, Calvin W............'92 | 5 00 | |
| Price, Charles A.............'91 | 5 00 | |
| Price, Charles H.............'91 | 5 00 | |
| Price, Joseph................'91 | 5 00 | |
| Prieson, Adolph..............'91 | 5 00 | |
| Procter, Wallace.........'91-'92 | 10 00 | |
| Puckner, William A..........'92 | 5 00 | |
| Pursell, Howard.............'92 | 5 00 | |
| Pursell, Nicholas S...........'91 | 5 00 | |
| Quackinbush, Benj. F........'92 | 5 00 | |
| Qvale, Victor A..............'92 | 5 00 | |
| Rademaker, Herman H......'91 | 5 00 | |
| Ramsperger, Gustavus.......'92 | 5 00 | |
| Rapelye, Chas. A............'91 | 5 00 | |
| Ray, Frederick E............'91 | 5 00 | |
| Raymond, Harry L..........'92 | 5 00 | |
| Raynale, Frank B............'92 | 5 00 | |
| Reichardt, F. Alfred......'91-'92 | 10 00 | |
| Renz, Frederick J............'91 | 5 00 | |
| Reynolds, Chas. E...........'91 | 5 00 | |
| Reynolds, Howard P.........'92 | 5 00 | |
| Reynolds, John J............'91 | 5 00 | |
| Reynolds, Wm. K............'91 | 5 00 | |
| Rhoades, Stephen H.........'92 | 5 00 | |
| Rhode, Rudolph E.......'91-'92 | 10 00 | |
| Rice, Charles................'92 | 5 00 | |
| Rich, Willis S...............'91 | 5 00 | |
| Riesenman, Joseph...........'91 | 5 00 | |
| Riley, Charles W............'91 | 5 00 | |
| Rives, Edward B.............'92 | 5 00 | |
| Robbins, Alonzo.............'91 | 5 00 | |
| Roberts, Daniel J............'91 | 5 00 | |
| Robertson, Felix O...........'92 | 5 00 | |
| Robin, Oscar................'91 | 5 00 | |
| Robinson, Edward A.........'92 | 5 00 | |
| Robinson, Ernest F..........'91 | 5 00 | |
| Rockefeller, Lucius..........'92 | 5 00 | |
| Roehrig, Albert M...........'91 | 5 00 | |
| Rogers, Arthur H............'91 | 5 00 | |
| Rogers, Wiley...............'91 | 5 00 | |
| Ruete, Theodore W..........'91 | 5 00 | |
| Rumsey, Samuel L.......  ...'92 | 5 00 | |
| Runyon, Edward W......'91-'92 | 10 00 | |
| Rusby, Henry H.............'92 | 5 00 | |
| Rust, William...............'92 | 5 00 | |
| Ryerson, Henry O...........'92 | 5 00 | |
| Sauer, Louis W..............'91 | 5 00 | |
| Sauerhering, Rudolph A......'92 | 5 00 | |
| Sawyer, Wm. F..........'91-'92 | 10 00 | |
| Sayre, Lucius E..........'91-'92 | 10 00 | |
| Sayre, Wm. H...............'92 | 5 00 | |
| Schaap, John E..............'91 | 5 00 | |
| Schafer, George H............'92 | 5 00 | |
| Amount carried forward....... | $4130 00 | $56 25 |

| | Annual Dues. | Certificates. |
|---|---|---|
| Amount brought forward | $4130 00 | $56 25 |
| Schathirt, Adolph J. '91-'92 | 10 00 | |
| Scheffer, Emil '91 | 5 00 | |
| Scheffer, Henry W '92 | 5 00 | |
| Schellentrager, E. A. '92 | 5 00 | |
| Scherff, John P. '92 | 5 00 | |
| Scherling, Gustav '91-'92 | 10 00 | |
| Schiemann, Edward B. '91 | 5 00 | |
| Schlaepfer, Henry J. '92 | 5 00 | |
| Schley, Steiner '91 | 5 00 | |
| Schlotterbeck, Julius O. '92 | 5 00 | |
| Schmid, Henry '92 | 5 00 | |
| Schmidt, Ferdinand T. '91-'92 | 10 00 | |
| Schmidt, Florian C. '91-'92 | 10 00 | |
| Schmidt, Frederick M. '91 | 5 00 | |
| Schmidt, Valentine '91-'92 | 10 00 | |
| Schmitt, Geo. J. F. '92 | 5 00 | |
| Schmitt, Joseph M '92 | 5 00 | |
| Schoettlin, Albert J. '91 | 5 00 | |
| Scholtz, Edmund L. '91 | 5 00 | |
| Schrank, C. Henry '92 | 5 00 | |
| Schreck, Leo S. '92 | 5 00 | |
| Schueller, Ernst '92 | 5 00 | |
| Schueller, Frederick W. '92 | 5 00 | |
| Schurk, Louis '91 | 5 00 | |
| Schweikhardt, Richard '91-'92 | 10 00 | |
| Scott, Frank G. '92 | 5 00 | |
| Scott, George T. '91 | 5 00 | |
| Scott, William H. '92 | 5 00 | |
| Scott, Wm. J. '89-'90-'91 | 15 00 | |
| Scoville, Charles H. '91 | 5 00 | |
| Scoville, Wilbur L. '92 | 5 00 | |
| Scribner, John C. '92 | 5 00 | |
| Searby, Wm. M. '91-'92 | 10 00 | |
| Sedberry, Bond E. '91-'92 | 10 00 | |
| Seitz, Oscar '91-'92 | 10 00 | |
| Sennewald, Ferdinand W '91 | 5 00 | |
| Serodino, Herman '91-'92 | 10 00 | |
| Sevin, N. Douglas '93 | 5 00 | |
| Sharp, Harry '91 | 5 00 | |
| Sharples, Stephen P. '92 | 5 00 | |
| Shaw, Robert J. '91 | 5 00 | |
| Sherwin, Eugene A. '92 | 5 00 | 2 50 |
| Sherwood, Louis W. '92 | 5 00 | |
| Shiels, George E. '92 | 5 00 | |
| Shinn, James T. '91-'92 | 10 00 | |
| Shoemaker, Richard M. '92 | 5 00 | |
| Shryer, Thomas W. '91 | 5 00 | |
| Shurtleff, Israel H. '92 | 5 00 | |
| Siegemund, Chas. A. '91 | 5 00 | |
| Siegenthaler, Harvey N '92 | 5 00 | |
| Simms, Giles G. C. '91-'92 | 10 00 | |
| Simon, William '92 | 5 00 | |
| Simpson, William '92 | 5 00 | |
| Simonson, William '91 | 5 00 | |
| Simson, Francis C. '91 | 5 00 | |
| Sippy, Alvin H. '91 | 5 00 | |
| Skelly, James J. '92 | 5 00 | |
| Slater, Frank H. '91-'92 | 10 00 | |
| Sloan, George W '91-'92 | 10 00 | |
| Slocum, Frank L. '91 | 5 00 | |
| Smith, Amasa D '92 | 5 00 | |
| Smith, Charles B. '92 | 5 00 | |
| Smith, Clarence P. '92 | 5 00 | |
| Smith, Edward N. '91-'92 | 10 00 | |
| Smith, Edward S. '92 | 5 00 | |
| Smith, Frank R '90-'91 | 10 00 | |
| Smith, Henry '91 | 5 00 | |
| Smith, J. Hungerford '91 | 5 00 | |
| Smith, Joseph S. '91-'92 | 10 00 | |
| Smith, Linton '92 | 5 00 | |
| Smith, Reuben R '92 | 5 00 | |
| Smith, Samuel W '92 | 5 00 | |
| Smith, Theodric '91 | 5 00 | |
| Smith, Willard A. '91-'92 | 10 00 | |
| Smith, William C. '92 | 5 00 | |
| Amount carried forward | $4605 00 | $58 75 |

| | Annual Dues. | Certificates. |
|---|---|---|
| Amount brought forward | $4605 00 | $58 75 |
| Smithson, David E. '92 | 5 00 | |
| Sniteman, Charles C. '91 | 5 00 | |
| Snow, Charles W '92 | 5 00 | |
| Snyder, Alva L. '91 | 5 00 | |
| Snyder, DeWitt C. '91 | 5 00 | |
| Snyder, Robert J. '91 | 5 00 | |
| Soetje, Edward C. '91 | 5 00 | |
| Sohn, Frank '91 | 5 00 | |
| Sombart, John E. '91 | 5 00 | |
| Spalding, Warren A '92 | 5 00 | |
| Spangler, H. W. '91 | 5 00 | |
| Spengler, John G. '91 | 5 00 | |
| Spenzer, Peter I. '91-'92 | 10 00 | |
| Sperry, Herman J. '92 | 5 00 | |
| Spofford, Charles B. '91 | 5 00 | |
| Squibb, Edward H. '91-'92 | 10 00 | |
| Squibb, Edward R. '91-'92 | 10 00 | |
| Squires, George B. '91 | 5 00 | 5 00 |
| Stacey, Benjamin F '92 | 5 00 | |
| Stahler, William '92 | 5 00 | |
| Stahlhuth, Ernst H. W. '91-'92 | 10 00 | |
| Stamford, William H. '92 | 5 00 | |
| Stanley, Edgar C. '91 | 5 00 | |
| Starr, Thomas '92 | 5 00 | |
| Staudt, Louis C. '92 | 5 00 | |
| Stearns, Henry A. '91-'92 | 10 00 | |
| Stebbins, Harry F '91 | 5 00 | |
| Steele, James G. '91-'92 | 10 00 | |
| Steinhauer, Frederick '91-'92 | 10 00 | |
| Stevens, Fred D. '91 | 5 00 | |
| Stierle, Adolph '91 | 5 00 | |
| Stone, Clarence G. '91 | 5 00 | |
| Stoughton, Dwight G. '91 | 5 00 | |
| Stowell, Daniel '91 | 5 00 | |
| Strassel, William '91 | 5 00 | |
| Strater, Henry H '91 | 5 00 | |
| Strathman, Charles A. '91 | 5 00 | |
| Sweet, Caldwell '92 | 5 00 | |
| Tartiss, Alfred J. '91 | 5 00 | |
| Taylor, Celia W. '91 | 5 00 | |
| Taylor, John P. '92 | 5 00 | |
| Thomas, Oscar E '91 | 5 00 | |
| Thomas, Robert, Jr. '91 | 5 00 | |
| Thompson, Frank A. '91 | 5 00 | |
| Thompson, Wm. S. '91-'92 | 10 00 | |
| Thompson, Wm. S. '91 | 5 00 | |
| Thomsen, John J. '91-'92 | 10 00 | |
| Thomsen, John J., Jr. '91-'92 | 10 00 | |
| Thorn, Henry P. '92 | 5 00 | |
| Thurston, Azor '92 | 5 00 | |
| Tiarks, Hermann '92 | 5 00 | |
| Tobin, John M. '91 | 5 00 | |
| Todd, Albert M '91-'92 | 10 00 | |
| Tomfohrde, Charles W '91 | 5 00 | |
| Tomfohrde, John W. '91 | 5 00 | |
| Topley, James '92 | 5 00 | |
| Torbert, Willard H. '92 | 5 00 | |
| Travis, Miles B. '91 | 5 00 | |
| Treat, Joseph A. '92 | 5 00 | |
| Trimble, Henry '92 | 5 00 | |
| Truax, Charles '92 | 5 00 | |
| Tscheppe, Adolph '92 | 5 00 | |
| Tucker, Greenleaf R. '91-'92 | 10 00 | |
| Tuma, Bruno '92 | 5 00 | |
| Turner, Isaac W. '89-'90-'91 | 15 00 | |
| Uhlich, Ferdinand G. '91 | 5 00 | |
| Upson, Rosa '91 | 5 00 | |
| Urban, Jacob P. '91 | 5 00 | |
| Valliant, Geo. E. '92 | 5 00 | |
| Vandegrift, John A. '91 | 5 00 | |
| Van Winkle, Abraham W. '92 | 5 00 | |
| Vaughan, Parry W. '91 | 5 00 | |
| Vennard, Wm. L. '92 | 5 00 | |
| Vilter, Hermann T. '92 | 5 00 | |
| Vogt, Diedrich '91-'92 | 10 00 | |
| Amount carried forward | $5055 00 | $63 75 |

| | Annual Dues. | Certificates. |
|---|---|---|
| Amount brought forward...... | $5055 00 | $63 75 |
| Vogt, John G..................'91 | 5 00 | |
| Vordick, August H............'91 | 5 00 | |
| Voss, George W..............'92 | 5 00 | |
| Wagner, Henry...............'92 | 5 00 | |
| Walbrach, Arthur.........'91-'92 | 10 00 | |
| Walch, Robert H.............'91 | 5 00 | |
| Walker, Anselle..........'91-'92 | 10 00 | |
| Walker, John P...........'91-'92 | 10 00 | |
| Wall, Otto A..................'91 | 5 00 | |
| Walling, Walter A............'91 | 5 00 | |
| Walton, Joseph R.........'91-'92 | 10 00 | |
| Wangler, Conrad D.......'91-'92 | 10 00 | |
| Ward, Chas. A...............'92 | 5 00 | 7 50 |
| Warn, William E.............'92 | 5 00 | |
| Warren, Edwin A.............'91 | 5 00 | |
| Warren, Wm. M...............'91 | 5 00 | |
| Washburn, Harry M..........'92 | 5 00 | |
| Watson, Herbert K...........'91 | 5 00 | |
| Waugh, George J.............'91 | 5 00 | |
| Wearn, Wm. H................'91 | 5 00 | |
| Weaver, John A..............'91 | 5 00 | |
| Webb, Wm. H.................'92 | 5 00 | |
| Webber, J. LeRoy........'91-'92 | 10 00 | |
| Wehrly, Thomas M.......'91-'92 | 10 00 | |
| Weidemann, Charles A........'92 | 5 00 | |
| Weinman, Oscar C............'92 | 5 00 | |
| Weiser, Emilius I.............'92 | 5 00 | |
| Welch, Willard C., Jr.....'91-'92 | 10 00 | |
| Wells, Jacob D...............'92 | 5 00 | |
| Wendel, Henry E.........'91-'92 | 10 00 | |
| Wenzell, Wm. T..........'91-'92 | 10 00 | |
| Westcott, James W.......'91-'92 | 10 00 | |
| Westmann, F. H.............'91 | 5 00 | |
| Wetterstroem, Albert.........'91 | 5 00 | |
| Whall, Joseph S..............'91 | 5 00 | |
| Wharton, John C .........'91-'92 | 10 00 | |
| Wheeler, Leonard H.........'91 | 5 00 | |
| Whelpley, Henry M..........'91 | 5 00 | |
| Whitcomb, Frederick E.......'91 | 5 00 | |
| White, Geo. H............'91-'92 | 10 00 | |
| White, Richard E.........'91-'92 | 10 00 | |
| White, Wm. H................'92 | 5 00 | |
| Amount carried forward....... | $5335 00 | $71 25 |

| | Annual Dues. | Certificates. |
|---|---|---|
| Amount brought forward...... | $5335 00 | $71 25 |
| Whiting, Frederick T.........'92 | 5 00 | |
| Whitman, Nelson S...........'92 | 5 00 | |
| Whitney, Henry M...........'92 | 5 00 | |
| Wichelns, Frederick..........'92 | 5 00 | |
| Wickham, Wm. H.............'92 | 5 00 | |
| Wienges, Conrad.............'91 | 5 00 | |
| Wight, Oscar M..............'91 | 5 00 | |
| Wilcox, Frederick............'91 | 5 00 | |
| Williams, Benjamin C.........'92 | 5 00 | |
| Williams, Charles F..........'91 | 5 00 | |
| Williams, Duane B...........'91 | 5 00 | |
| Williams, George G...........'91 | 5 00 | |
| Williams, John K.............'91 | 5 00 | |
| Williams, Wm. H............'91 | 5 00 | |
| Wills, Fred. M...............'91 | 5 00 | |
| Wilson, Benj. O...........'91-'92 | 10 00 | |
| Wilson, Charles F.......................... | | 5 00 |
| Wilson, Wm..................'92 | 5 00 | |
| Winter, Jonas.................'92 | 5 00 | |
| Wolfe, Nathaniel .............'91 | 5 00 | |
| Wood, Alonzo F., Jr.........'92 | 5 00 | |
| Wood, Edw. S...............'92 | 5 00 | |
| Wood, Geo. M...............'91 | 5 00 | |
| Wood, James P...............'92 | 5 00 | |
| Wood, Mason B...............'91 | 5 00 | |
| Woodruff, Roderick S.........'91 | 5 00 | |
| Wooldridge, Daniel T.........'92 | 5 00 | |
| Woodward, Wm. F...........'91 | 5 00 | |
| Wray, George B.............'92 | 5 00 | |
| Wright, Edward E...........'92 | 5 00 | |
| Wurmb, Theodore H.........'91 | 5 00 | |
| Yeager, Alvin A..............'91 | 5 00 | |
| Young, John K...............'91 | 5 00 | |
| Youngs, Wm..................'91 | 5 00 | |
| Zahn, Emil A.................'91 | 5 00 | |
| Zellhoefer, George............'91 | 5 00 | |
| Ziegler, Philip M..........'91-'92 | 10 00 | |
| Zimmerman, Charles.........'92 | 5 00 | |
| Zoeller, Edward V............'91 | 5 00 | |
| Zuenkeler, J. Ferd............'92 | 5 00 | |
| Zwick, George A.............'92 | 5 00 | |
| Total......................... | $5545 00 | $76 25 |

# REPORT

ON THE

# PROGRESS OF PHARMACY.

**FROM JULY 1, 1891, to JUNE 30, 1892.**

PREPARED, UNDER THE DIRECTION OF CHARLES RICE, BY HANS M. WILDER, OF PHILADELPHIA, AND HENRY KRAEMER, OF NEW YORK.

PRELIMINARY NOTICE.

Circumstances which have already been fully stated or explained, both in the preceding volume (vol. 39, p. 28), and in the present one (vol. 40, p. 35, and p. 37), rendered it impossible for the undersigned, personally, to undertake the work of compiling materials for this report. He therefore asked for and obtained authority from the Council to cause the work to be performed by assistants, under his supervision, the salary attached to the office to be paid to them as compensation. He was fortunate enough to secure the services of very competent experts in the persons of Mr. Hans M. Wilder, of Philadelphia, and Mr. Henry Kraemer, of New York. The work was divided among them in such a manner, that Mr. Wilder took charge of all subjects except those belonging to Botany, Materia Medica, and Pharmacognosy, which latter were undertaken by Mr. Kraemer. Naturally, their compilations were, in some directions, found to be somewhat overlapping each other, and it became necessary, finally, to re-arrange the whole, and to amalgamate co-related subjects together, so that it became at last impracticable to append to each abstract or paragraph the name or initials of the compiler, which would otherwise have been the proper thing to do.

Both of the gentlemen named have bestowed great pains upon their work, and have acquitted themselves with credit. The functions of the undersigned consisted in laying out the plan of the work, advising with the compilers, generally superintending the work while in progress, and arranging it for publication.

CHARLES RICE,

*Reporter on the Progress of Pharmacy, 1891–1892.*

NEW YORK, *October 20, 1892.*

# PHARMACY.

## A. Apparatus and Manipulations.

### WEIGHTS, MEASURES, SPECIFIC GRAVITY, ETC.

*Standard of Weight and Measure.*—Th. Deecke, in speaking of A. Michelson's endeavor to establish a metric standard in terms of wave lengths of light, states that from a practical point of view the following points should be taken into due consideration.

(1) That on account of the inaccuracy of human observation, the value of all physical measurement is affected with errors. (2) That errors will be amplified the smaller the unit or standard of measure is, as accepted. (3) That this was one of the reasons why the length of the quadrant of the earth was determined for the purpose of procuring a standard measure in the meter, as nearly correct as possible for a unit of measurement of natural objects. (4) That it is not so much of importance to have this or that natural object as the basis for a standard measure, as it is to have the standard measure, which has been accepted, executed with all possible scientific accuracy and precision. (5) That this standard should be such as to secure the utmost facility in copying the same with all possible scientific accuracy and precision, without affecting or injuring the same in the least.—Pharm. Rundschau, N. Y., 1892, 36.

*Measuring Apparatus.*—Charles W. Proctor has devised an apparatus to facilitate the drawing and measuring of liquids from a barrel or tank situated at a distance, there being a flexible pipe connection, with proper faucets, between the barrel and the measuring apparatus. The latter consists of a closed vessel provided with a float passing through a sleeve at the top. The float ends in a pointer adapted to indicate gallons and subdivisions on a suitably arranged scale. In order to use it, the liquid is let in from the container (barrel, etc.) until the float indicates the required measure, when the faucet is closed, and through another faucet the liquid is run into the receiving vessel. The measuring vessel is mounted on a stand or rod, so as to be raised or lowered, in order to bring it below the level of the liquid in the container.—Am. Drug., 1891.

*Measuring the Contents of Casks, etc.*—Charles Rice gives the following very simple rule for quickly finding the weight measure of the contents of any container. This rule is based on the fact that one gallon of water (the specific gravity being assumed to be 1.000) at 60° F. will weigh 58.328 grains, or 8.33259 pounds: the weight of any liquid having a higher or lower specific gravity than water, will for every unit (in the specific gravity) under 1.000 be 0.00833 less than that of water, and for every unit over be 0.00833 more. The rule, therefore, is:

Weigh the container with contents, then empty the latter in any convenient manner, and weigh the empty container again. The difference, of course, is the weight of the contents in pounds. Now divide this weight by the weight of a gallon in pounds.

$$\frac{\text{Weight of contents in pounds}}{\text{Spec. grav.} \times 0.00833} = \text{gallons of liquid.}$$

For metric weight and measure the rule would be

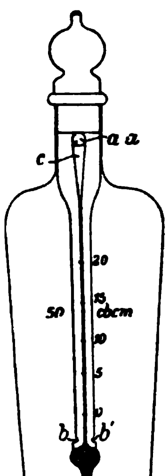
$$\frac{\text{Weight in kilos.}}{\text{Spec. grav.}} = \text{litres.}$$

—Am. Drug., 1892, 62.

*Specific Gravity Bottle.*—Dr. Fritz Voeller describes a new sp. gr. bottle:

It is a small bottle of about 50 C.c. capacity, having an accurately ground stopper to which a thermometer is fused. The latter consists of an interior mercury tube (the thermometer proper), and an exterior hollow tube having two small orifices near the bottom at *b* and *b'*, which permit the liquid to be tested to ascend along the mercurial column, so that the latter may indicate the true temperature. The same outer thermometer tube has a little hole above, at *a*, where the surplus liquid may run out. The neck of the flask has also a little hole exactly corresponding with the hole in the stopper when the latter is turned so as to meet it.

FIG. 1




Specific gravity bottle.

When the bottle is to be used it is filled with the liquid to be tested, at a temperature somewhat below 15° C., then the stopper slowly and gradually inserted, and turned so that the two orifices in the stopper and neck correspond. As the liquid expands while rising to 15° C., the surplus will exude through the orifice. The moment that 15° C. is reached, the stopper is rotated so as to cover the inner hole. The outside of the bottle is then thoroughly cleaned, and the bottle then weighed. Its capacity for water at 15° C. (or at 4° C.) being previously known, the specific gravity of the liquid is easily determined.—Am. Drug., 1891, from Zeitschr. angew. Chemie.

*Specific Gravity.*—Fruehling and Schulz recommend the use of cylinders with overflow, for very obvious reasons; in order to prevent the often disagreeable consequences of the running over of the liquids.—Am. Drug., 1891, Aug., 249, from Zeits. angew. Chem.

*Specific Gravity—Relation to the Boiling Point.*—A. E. Richardson endeavors to show that the specific gravity of a liquid is a function of its boiling point and molecular weight. An intelligible abstract not being possible, the readers are referred to Chem. News, lxiii., 58.

*Specific Gravities—Methods for taking.*—John F. Liverseege reviews the whole subject of taking the specific gravity of solids and liquids, mentioning with sufficient detail 22 different methods. The readers are referred to the Western Druggist, 1891, 414–418, or Drug. Circ., 1891, 269.

*Specific Gravity of Liquids Without the Use of Tables.*—The specific gravity of liquids which do not suffer any alteration of volume when mixed with water (or other liquid) may be determined, without the aid of special tables, by the use of the following formula:

Let us designate the several items entering into the calculation by letters:

G = the number of grammes of the denser liquid to be reduced.

S = the specific gravity of the denser liquid.

D = the specific gravity of the lighter or diluting liquid.

s = the desired specific gravity of the product.

Then we have

$$\frac{G}{S} + \frac{x}{D} = \frac{G+x}{s}$$

hence

$$x = \frac{DG(S-s)}{S(s-D)}$$

Whenever water is the diluent, D becomes 1.

Am. Drug., 1891, July, 222.

*Specific Gravity of Powders.*—W. J. Smeeth communicates the following methods for ascertaining the specific gravity of powdered minerals, but which, without doubt, can be applied to other powders. Put a little vaseline in a small watch-glass, heat to remove air-bubbles, and weigh in water; call that weight $w_1$. Remove the watch-glass from the water, heat again, dust with a weighed quantity of the powder in question, allow to cool, and weigh again in water; call the last weight $w_2$, and the weight of the powder W. The specific gravity is then $\frac{W}{W - [w_2 - w_1]}$.—Chem. Zeitg. (Rep.), 1891, 299, from Zeits. Krystall.

*Specific Gravity of Solids.*—*Les Industries* describes the following apparatus: A burette, held by a clamp, is connected by means of a rubber tube with a bottle of known capacity, the bottle being provided with a stopper containing an overflow funnel. For use, fill the whole apparatus with water (or any liquid, having no action on the substance to be examined), and adjust the burette so that the level of the liquid in the funnel and the burette is absolutely alike. Now, lower the burette, so as to allow of the removal of the stopper without spilling any of the liquid, and introduce the substance. Replace the stopper, and raise the burette until the level is again alike; the difference between the first and the second readings on the scale of the burette represents the volume of water in c.c., which has been displaced by the substance. If the latter had previously

been weighed in air, in grammes, it is only necessary to divide by the number of c.c. of water displaced.—Am. Drug., July 1891, 219.

*Specific Gravity Calculations.*—See also below, under *Liquores.*

*Areo-Pycnometer.*—Fritsch-Kreidel's areo-pycnometer is a very ingenious piece of apparatus, suitable not only for beet-juice (for which it was first intended) but also for the rapid determination of the specific gravity of other liquids of which only a small quantity is available. The liquid to be determined is introduced into a small container which forms the lower "bulb" of the areomèter, the "stem" is screwed on, and the instrument is immersed into pure water of normal temperature. The scale may be marked in any convenient way, the "zero" point being introduced by charging the "bulb" with pure water at normal temperature, and marking the place on the stem to which the latter sinks in pure water.—Am. Drug., 1892, 39.

*Hydrometer (Areometer)—Hint as to Proper Use.*—F. Maly calls attention to the fact that it is impossible to obtain reliable indications with a hydrometer the stem of which is not perfectly clean, especially completely freed from fat. He states that rubbing it off with a perfectly dry cloth (rag), be the latter ever so clean, will not insure removal of the greasy film; the cloth must be damp, if not moist, and the evaporation of the moisture can be hastened by dipping the stem afterwards in alcohol.—Pharm. Zeitg., 1892, 123.

*Areometer—History.*—Bourgougnon states that the invention of the areometer is generally ascribed to Hypatia, who lived in Alexandria from 370 to 419 A. D.; she describes it under the name "Baryllion." Rhamnius Fannius Palæmon, however, mentions the areometer in his poem, "De ponderibus et mensuris;" he lived about 50 A. D., under the Emperor Claudius, and it is quite possible that the invention should be ascribed to Archimedes. Neither Fahrenheit, Nicholson nor Baumé mention either of them. The editor of Chem. Zeitg. states that Priscianus (about 528 A. D.), mentions the instrument as being made of sheet-copper or silver, and he gives fairly correct figures for the density of potable and salt water, oil and honey. In the eleventh century the Egyptian sugar manufacturers knew well how to examine the cane juice with such instruments. It is probable that Pliny refers to the areometer when he mentions that there is very little difference in the density of various kinds of water. Alkhazini (about 1100 A. D.) knew that the temperature influences the specific gravity.—Chem. Zeitg., Rep., 1892, 166.

*Litre—Standard.*—In view of the intention of the German Imperial Standards Commission to adopt the "true" litre as a standard for measuring vessels for chemical purposes, W. Fresenius gives the following practical reasons for retaining the so-called "Mohr's" litre, which is about 2 c.c. greater than the true litre.

It is the common practice to express the specific gravity of liquids with reference to water of the same temperature (and that a mean working temperature) as unity, and it is very convenient to express the unit of weight and that of volume by an identical number under practical working conditions; besides, confusion would result from neglect of the corrections rendered necessary by the employment of "true" litre vessels at any temperature other than 0° C.—Am. Drug., 1862, 41, from Zeits. Analyt. Chem.

FILTRATION, ETC.

*Filtering Paper—Unreliability.*—L. Padé calls attention to the poor quality of ordinary white filtering paper. He found as much as 10.4 per cent. of ash, of which 7.6 per cent. was calcium sulphate. Such paper is quite unsuitable for analytical work.—Zeits. Analyt. Chem., 1891, 612, from Bull. Soc. Chim., xlvii., 242.

*Filtering Paper.*—W. Thorp states that ammonia is exceedingly hard to remove from filtering paper by washing, however much prolonged.—Chem. Drug., March 1892, 366.

*Filters—Toughened.*—Filters, the points of which have been "toughened" (rendered more resistant) by dipping in nitric acid of sp. gr. 1.42, have been in use for several years (see Proceedings 1885, xxxiii., 42); it is now proposed to treat the whole filter with the acid, which renders them when wet quite as untearable as filters made from parchment paper. These filters can stand a pressure of 2 to 3 atmospheres, and prevent the finest precipitates from passing through; it is also stated that they can be washed sufficiently to allow of being used over again.—Pharm. Centralh., 1891, 655.

*Filtering Paper—Test for Starch.*—Salzer recommends to test filtering paper with iodine water for starch.—Pharm. Zeitg., 1892, 224.

*Filter Pump.*—Max Stuhl has constructed a filter pump, which requires much less water than any pump heretofore constructed. It works well with only one atmosphere, and may also be used to produce a blast. Suction takes place through a tube connected in the usual manner with the vessel from which the air is to be exhausted. When the apparatus is to be used for suction, that is, for rapid filtration, a lateral tube opening into the air chamber is closed with a cap or by a rubber tube and pinchcock.

The apparatus may also be used to produce a blast. In this case the lateral tube is connected with the blowpipe, and the flow of water is carefully regulated so that the blast will have just the desired strength, without any permanent collection of water in the air chamber. It is capable of producing an evacuation to as low as 20 mm.

The apparatus, which is figured in American Druggist, 1891, 347, is

manufactured in one piece, and mounted on a board, by Max Stuhl, of Berlin.

*Percolator—Pressure.*—A. M. Platt has devised a very effective pressure percolator which is operated on the exhaust principle of a Sprengel pump. The cork of the receiving vessel is provided with two glass tubes, one connecting with the percolator and the other with an aspirator, which latter is merely a "T" tube connecting the hydrant with the glass tube.—Pharm. Era, 1892, 113.

*Presses—Ancient.*—An interesting account of the different forms of the presses of the Romans, Greeks, Egyptians, etc., is given, and compared to some modern ones, including the "matapi" of the South American Indians.—Am. Drug., 1891, 373.

*Strainer.*—F. Edel recommends a porcelain straining frame as being cleanlier than the usual tin strainers.—Am. Drug., 1891, 271, from Pharm. Era.

*Absorbents for Drying Precipitates, etc.*—P. Hartmann recommends plates of wood pulp as superior for this purpose to the plates of gypsum or chalk generally employed.—Am. Drug., Aug. 1891, 232, from Zeits. Analyt. Chemie.

*Precipitates—Washing Readily Oxidizable.*—J. A. Forret has devised a wash-bottle by means of which oxidation of the precipitates during washing is reduced to a minimum. A wide-mouthed bottle of convenient size is fitted with a cork carrying four glass tubes (A, B, C, D). The tube C is prolonged inside the bottle, and to the other end is attached a longer piece of glass tubing, by which the water is syphoned off, C being raised or lowered according to the depth of the precipitate. To the tubes A and B are attached short lengths of rubber tubing, A being connected with a syphon dipping into a vessel of recently well-boiled water, placed on a level above the wash-bottle. The remaining tube D is connected either with the gas supply, or an apparatus for generating carbonic acid gas. The method of using it is well shown by the directions for preparing carbonate of iron, which see.—Pharm. Journ. Trans., Sept. 1891, 225.

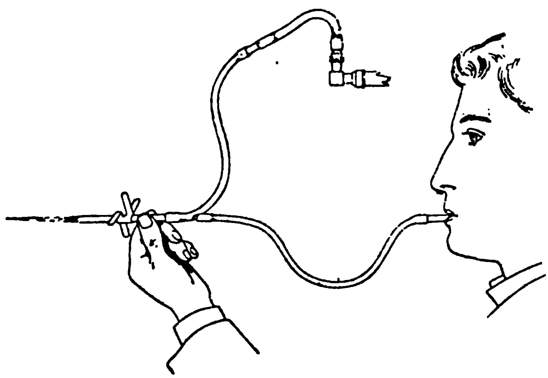
## APPLICATION OF HEAT.

*Blow-pipe—Improved.*—C. G. Moor has invented a blow-pipe, the merits of which consist in the facility with which it can be brought to bear upon any point, at any angle. The control and direction of the flame can be regulated simultaneously with the same hand. As will be seen from the illustration, the pipe is bifurcated, one arm terminating in a glass mouthpiece, and the end of the other arm to be slipped over the gas burner.—Am. Drug., 1891, 329, from Scient. Am. Suppl.

*Blow-pipe for Mineral Oils.*—Paquelin has devised a new blow-pipe which consists of three essential parts: a blow-pipe, properly speaking, a

carburettor and a double-action blast. The jet has this characteristic, that it emits two kinds of flames: a central with a very narrow point, and small lateral flames in the form of petals. The carburettor serves for three purposes: to mix air and oil-vapors in proportions to be regulated at will; to exhaust the combustible of all its useful elements; to regulate the length of flame at pleasure. These results are obtained by means of two cocks

FIG. 2.



Moor's Blow-Pipe.

and a saturator.—Chem. News, 1891, lxiv., 125, from Comptes rendus, cxiii., Aug. 1891.

*Alcohol Lamp—Best Form.*—M. T. Lecco draws attention to the fact that the flat form, often met with, is a very unsafe one, owing to the liability of unequal expansion. He recommends a conical, or rather a turnip-shaped one. Of those in the market at present, the globular is the safest. —Am. Drug., July 1891, 216, from Chem. Zeitg.

*Safety Lamps.*—Apparatus for testing their sensitiveness.—Frank Clowes.—Chem. News, July 3, 1891, 2.

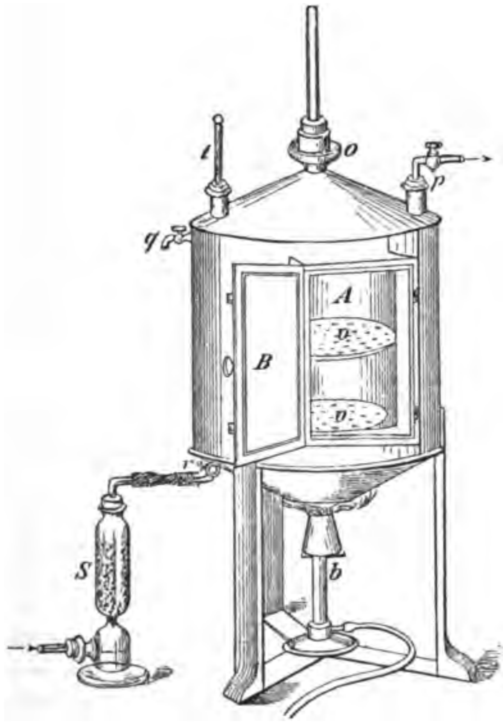
*Water Baths—Porcelain.*—W. Dittmar highly recommends porcelain water-baths as being much superior to metallic ones, being much cleaner, and less liable to contaminate materials placed upon them.—Am. Drug., 1892, 37, from Chem. Zeitg.

*Evaporating Pans—Automatic Feeding.*—An ingeniously constructed automatic feeder has been illustrated and described in American Druggist, August 1891, 253, from Chem. Zeitg.

*Drying Oven—Improved.*—Soxhlet has devised a drying oven in which the chief defects have been very materially reduced, so that, for instance, the determination of milk solids, which heretofore consumed (with the Adams coil) from three to four hours, has been reduced to twenty minutes. For illustration and detailed description see American Druggist, Aug. 1891, 235.

*Drying Apparatus.*—A. Sidersky has devised the following apparatus, which works under a partial vacuum. It consists of a cylinder of double

FIG. 3.




Drying Apparatus.

copper walls about 12 inches high and 14 inches in diameter. Its inner bottom is flat, while the outer is made to bulge downward. At the top the outer cylinder has a conical roof, provided with the openings *p* and *t*, which communicate with the interior. B is a door which can be closed hermetically, being lined at the edges with rubber. At *r*, near the bottom, is an inlet provided with a stopcock, by means of which a current of dry air may be admitted to the interior.

When the apparatus is to be used water is poured into the opening at *o* until it begins to flow from *q*. A cork bearing a long glass tube is then inserted in *v*. This acts as a condenser. A thermometer is inserted in *t*, and *p* is connected with the air or vacuum pump. The water in the space between the two walls is now heated by means of a suitable burner, the stopcock at *q* having, of course, been previously closed. Next the vacuum pump is set going, when the vapors given out by substances placed in the inner chamber will be rapidly drawn off, causing a speedy drying of the

introduced substances. When the operation of drying is completed, the stopcock *r* is opened, and a current of air, dried by passing through the chloride of calcium tube S, is drawn through the apparatus.—Am. Drug., 1891, 317, from Chem. Centralblatt.

*Boiling—Prevention of Bumping.*—E. Pieszczek makes use of a piece of glass tubing 5-8 cm. (2 3 inches) long and 5-10 mm. ($\frac{3}{16}$-$\frac{3}{8}$ inch) diameter, closed at one end, and in this end a piece of platinum wire is fused; the wire should be long enough to extend above the liquid; the open end of the tube is to be placed down in the liquid. During ebullition the air in the tube is displaced, and on cooling the tube fills with the liquid; before each operation the tube must be freed from liquid so that it is full of air when introduced into the liquid to be boiled or distilled. This device answers admirably in the distillation of volatile liquids, also in boiling liquids holding fine powders in suspension, like barium sulphate, etc., likewise in the estimation of volatile fatty acids in butter analysis.—Am. Jour. Pharm., 1891, 484, from Chem. Zeitg., 1891, 1126.

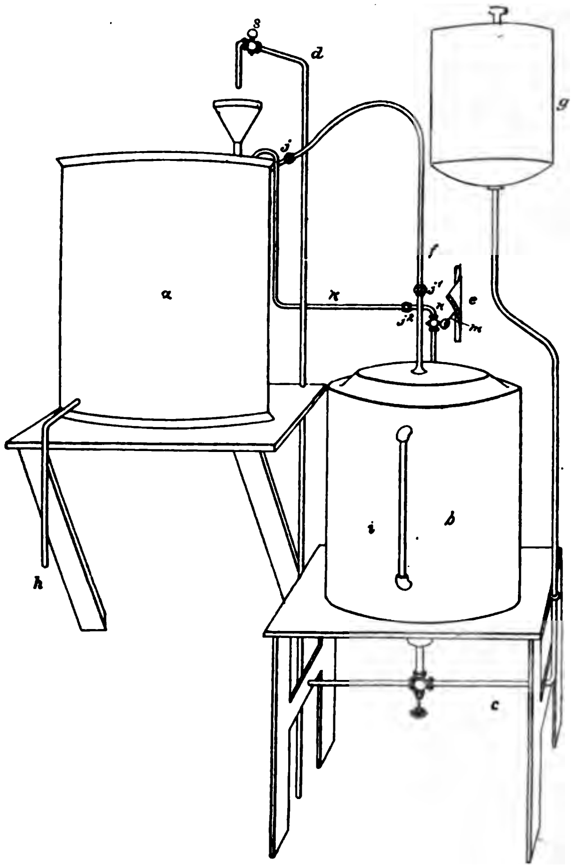
*Boiling—Bumping Prevented.*—George Craig discusses the various causes of the bumping in boiling liquids, and the best means to prevent it. When bumping is caused by the presence of heavy precipitates, it is only requisite to keep them in suspension by mechanical means, or by rapid ebullition to stop the bumping. In homogeneous acid, alkaline or neutral liquids, bumping is due to the practical absence of air or gas. The only rational method is to aërate the liquid, which is best accomplished by the slow and minute evolution of some gas insoluble in the liquid under operation. In all cases where the liquid is an electrolyte, it is best to pass an electric current through it. The battery wires, which terminate in thin platinum wires, may be introduced inside a piece of glass tubing, the end being fused so that only about one inch of the platinum wires is in contact with the liquid. The same slow aëration can also be effected by the introduction of a fine powder which will interact with the liquid, and slowly evolve gas; for instance, zinc dust. Bumping also takes place when non-homogeneous liquids (or immiscible liquids) are to be boiled or distilled together; the remedy is also aëration, best by zinc dust. It requires only a few grains, or a very small quantity.—Am. Drug., 1892, 166, from Chem. News, 1892, lxv.

*Thermometer Scale—Salomon.*—F. Salomon proposes to make the scale correspond to the expansion of gases. The division would then be as follows: the absolute zero is —273° C.; from this point to the freezing point the scale is to be divided into 100 parts, so that 0° C.=100° Sal. From the freezing point of water to +273° C., the scale is again divided into 100 parts, making +273° C. equal to 200° Sal., and so on. 1° Sal. = 2.73 C., and 1° C.=0.3665° Sal.; the boiling point of water will then be 136.6° Sal. One-tenth degrees could easily be read on such a scale.—Zeitschr. angew. Chem., 1891, 409.

Plausible as this scale may seem to be, the use of it would nevertheless entail such inconveniences that it would not be advisable to introduce it. For demonstration see Chem. Zeitg., 1891, 1157.

*Still—Constant Feed Apparatus (for Distilling Water).*—W. M. Stine has devised an apparatus for the continuous distilling of water, which requires but little attention, and is very economical.

FIG. 1.




**Stine's Constant-Feed Apparatus for Distilling Water.**

The drawing shown is an outline view of the still as it stands in the laboratory. The condenser, *a*, stands on a shelf fastened to the wall, *b* is the boiler or evaporator, and *c* a gasoline stove supported on a table, while *g* is the gasoline tank. To the boiler is attached the water gauge, *i*, while the steam pipe, *f*, passes to the rear of the condenser. A siphon pipe, *k*, leads the hot water from the top of the condenser to the bottom of the boiler, and the feed is regulated by the gauge cock at *e*.

The gasoline stove, which is considerably cheaper to operate than a gas burner, is of the single-burner type. The boiler resting on this is made of planished tinned sheet copper of the thickness ordinarily used by tinners, and has the tinned surface turned in; it is 12 inches high, by 10 inches in diameter. Both top and bottom of boiler are pressed copper plates, such as are employed for the bottoms of coffee boilers.

The bottom should have the *concave* surface turned out so as to catch the flame and heat from the stove, while the *convex* surface is turned outward on the top.

The condenser in this case is 11 by 14 inches, made of zinc, and contains the usual coil of lead pipe.

The author suggests the use of a 5 gallon cask, or even of a lard can, with a coil of ⅜-inch lead pipe, about 20 feet in length.

The cold water is supplied to the condenser by the pipe *d*, and falls into a funnel attached to a pipe leading it to the bottom, where, as it becomes heated, it rises and passes off through an overflow pipe so placed as to always keep the end of the steam pipe covered. The condenser may be permanently placed on a shelf, and so adjusted that the surface of the water in it is at least 18 inches above the usual water level in the boiler. This will insure sufficient fall to operate the siphon.

In the operation of the apparatus, steam passes into the condenser and heats the water circulating around its coils as the result of its condensation; this then rises to the top, and there passes off through the overflow pipe and the feed pipe to the boiler.

The distilled water drops from the end of the condenser coil at *h*.

The capacity of a still with these dimensions is about 1 quart of water per hour, with a moderate fire, burning 2 quarts of gasoline in ten hours. This, with gasoline costing 13 cents per gallon, makes the expense of distilled water about 2½ cents a gallon.—Am. Drug., 1891, 285.

*Refrigeration.*—Pictet's Process, see under GENERAL CHEMISTRY.

LABORATORY APPARATUS, DISPENSING UTENSILS, ETC.

*Generator for Gases.*—C. G. Moor has devised an inexpensive gas generator which, however, does not embody any new principle, being merely a modification of the idea according to which a Grenet's bichromate battery is constructed. (Similar generators can be seen in Proceedings 1880, xxviii., 214; 1887, xxxv., 196; 1889, xxxvii., 513.)—Am. Drug., 91, 376, from Chem. News.

*Gasometric Apparatus.*—A. Baumann has devised a gasometer which, he claims, is less liable to error than Lunge's apparatus. For illustration and description the readers are referred to Am. Drug., Aug. 1891, 249, from Zeits. angew. Chem.

*Graduated Siphon.*—Julius Stieglitz has devised a siphon arrangement which enables one to draw off definite volumes. Shortly stated, it consists

of a graduated cylinder on a foot (such as are found in every analytical laboratory) to which is fitted a cork provided with two glass tubes. One of the tubes is bent twice at right angles, long enough to reach with one arm to the bottom of the cylinder, and the other arm so much longer as to act

FIG. 5.

**Graduated Siphon.**

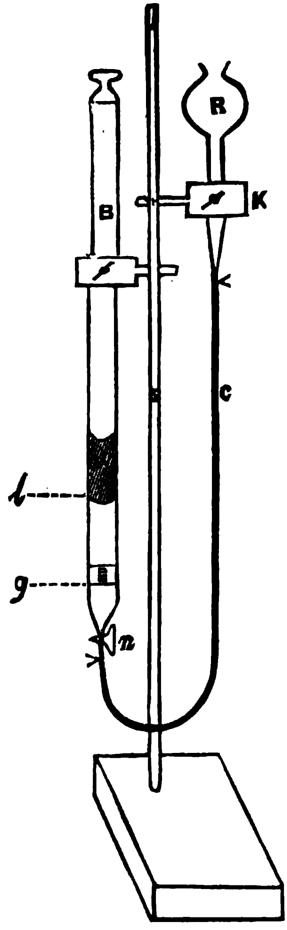
as a siphon; the last arm is provided with a glass-cock or a pinch-cock. The second glass tube is short and bent once at a right angle, serving merely to start the siphon. For accurate work it will be necessary, of course, to know the exact volume of the inner arm of the siphon tube.—Pharm. Rundschau, N. Y., 1892, 31.

*Pipettes—Improved Graduation.*—Dr. Charles O. Curtman calls attention to the trouble, experienced by nearly all beginners in analysis, in stopping the flow from the pipette at the right moment, as soon as the meniscus of the liquid reaches the particular c.c.-mark. Dr. Curtman ascribes the difficulty correctly to the method of marking the graduation from above downward, and he thinks it better to locate the "O" mark exactly flush with the meniscus of that small quantity of liquid which by capillary attraction remains in the tapering point of the pipette, and then to graduate upward. The analyst will now have no difficulty in measuring the exact quantity of liquid wanted, and let it run out, just as with a volume pipette. Such a pipette is really a volume pipette for all the intermediate graduations.—Pharm. Rundschau, N. Y., 1891, 236.

*Burettes—Calibration.*—In place of the usual method, involving several

weighings and level-readings, Douglas Carnegie proposes the following, which consists in causing a constant volume of liquid to slide in the burette (so that it may be made to assume any desired position therein), and then reading off its length in terms of the burette division :.

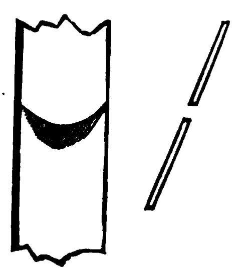
FIG. 6.




In Fig. 1 the burette, B, is attached by means of a caoutchouc tubing, C, to a reservoir, R, which is filled with water, and which can easily be raised or lowered by sliding the clamp, K, along S. On the surface of the water in the burette, there is a small column of carbon bisulphide, W, which obviously can be made to assume any position in the burette by either raising or lowering R, and then turning the stop-cock, n, very gently. The burette must be *thoroughly cleaned* from grease and dust before calibration. The reservoir, R, is then filled with freshly-distilled water, and matters so arranged that the level of the water stands at g, the lowest graduation of the burette. Through a long thistle funnel 5 c.c. of recently-distilled bisulphide of carbon is poured gently on the surface of the water. In spite of its high specific gravity, the bisulphide floats on the water, exhibiting two easily localized concave meniscuses.—Chem. News, July 24, 1891, 42.

*Burettes.*—A. F. Reid fixes a sliding scale or vernier of sheet metal, which slides on the outside of the burette, and which comes very handy when successive small quantities of solution are taken from the same burette.

Another improvement consists of a burette of rather large bore with a graduated tube inside. An india-rubber band is firmly fixed round the bottom of this tube, so as to form a piston which slides inside the burette. By shoving down the inside tube after each titration, the surface of the liquid is brought to the zero of the scale.—Chem. News, 1892, lxv., 125.

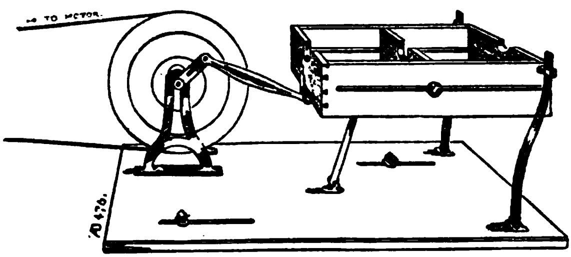


Burette.

*Burette-Float.*—R. Benedikt recommends to apply the "mark" on the inside of the float, which will prevent its being rubbed off or otherwise rendered indistinct. The marking is best done by inserting into the float a thin-walled tube bearing the mark; the inner tube must, of course, fit the outer tube closely.—Chemiker Zeitg., 1892, 217.—(Eberhardt's modification of Erdman's float, described in Proceedings 1891, xxxix., 273, appears to be more practical.—Rep.)

*Laboratory Shaker.*—W. R. Dunstan and J. S. Dymond have devised the following laboratory shaker: It consists of a wooden tray, into which can be firmly fixed, by means of a sliding partition, a bottle or other vessel of any size up to that of a Winchester quart. This tray is supported underneath, near the front, by a rod which is capable of moving backward or forward on a pivot. At the back its supports are two flexible steel laths, one end of each being clamped to either side of the tray, the other end being

FIG. 7.



Laboratory Shaker.

firmly fitted in the baseboard of the machine. Motion is communicated by means of a crank and connecting rod. This rod can be attached to the crank at different distances from the axle, so that the extent of the excursions made by the truck may be varied. In order to avoid the necessity of altering the length of the cord which passes from the motor to the wheel, as a means for varying the speed, the wheel is made up of a number of wheels of different diameters, and the baseboard is provided with slots and thumb screws, by means of which it may be securely fixed to the bench at the required distance from the motor to make the driving belt taut.

The shaker may be obtained from Messrs. Baird & Flatlock, Cross street, Hatton Garden, E. C., London.—Am. Drug., 1892, 163, from Pharm. Jour. Trans.

*Shaking Apparatus.*—O. Guessefeld figures and describes a new apparatus for this purpose, which may be seen in Am. Drug., Aug. 1891, 232, from Zeits. angew. Chem.

*Automatic Stirring Apparatus.*—An ingenious and easily made automatic stirring apparatus is described and illustrated in "Bull. of Pharm.," 1891,

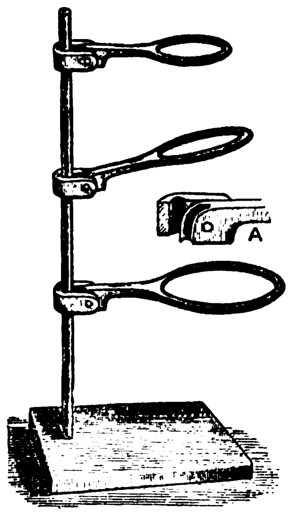
215. The motive power is furnished by water from the hydrant, which is allowed to fall upon a kind of over-shot wheel (made by fastening sheet-tin scoops to the circumference of a disk of wood), the axis of which is provided with a smaller grooved disk connected by a string with a grooved disk on the axis of the stirrer. The over-shot wheel is fixed over the sink.

*Centrifugal Machine.*—W. Thoerner recommends for the use of chemists (for analytical and microscopical investigations) a very handy centrifuge, which is easily turned by hand, each turn of the crank making the centrifugal disk revolve 184 times, so that 6 to 7000 revolutions per minute can be obtained with ease. It is the "Victoria" centrifuge of Waston, Laidlaw & Co., in Glasgow. Such a machine would be quite useful in pharmaceutical laboratories.—Chem. Zeitg., 1892, 1201.

*Laboratory Supplies.*—In the Journal of Analytic Chemistry for June will be found a paper by David H. Browne, giving valuable hints to beginners about necessary and unnecessary apparatus, for which the reader is referred to the original or an abstract in American Druggist, 1891, 231.

*Retort Stand.*—C. G. Moor has devised the following stand, the rings of which are fixed in a peculiar way, so that the heavier the weight the

FIG 8,




Retort Stand.

firmer becomes the grip upon the upright.—Am. Drug., 1891, 329, from Scient. Am. Suppl.

*Wash Bottle.*—Buechner improves the well-known "Spritz," by making it entirely of enameled iron (or granite-ware). He prefers the Erlenmayer shape, which is much like the gas-fitters' alcohol lamp.—Chem. Zeitg., xv., 916.

*Drug Mill.*—One of the latest mills has several novel features: the chief one of which is the adjustment of the grinding plate. The axle carrying the pulley and grinding plate is loosely bolted to solid supports, and is double-jointed, permitting the lower half to which the grinding plate is attached to assume various angles of inclination corresponding to the varying thicknesses of fragments which are passed between the grinding surfaces. The hopper is kept in vibratory motion by the revolution of the axle. For illustration of the mill, reference must be had to American Druggist, 1891, 345.

*Glass Dishes—Graduated.*—Meyerhoff recommends to provide the flat-bottomed glass evaporating dishes with outside graduation, which will enable one to evaporate without trouble to a definite volume.—Chem. Zeitg., xv, 916.

*Refractometers.*—F. W. Warrick gives descriptions of several refractometers used at present, accompanied with illustrations, mentioning especially Jean's oleorefractometer, Abbe's refractometer, and those of Bertrand, Dupré and Fery. He especially recommends the latter. Not being suitable for abstraction and too long for insertion, the readers are referred to Chem. and Druggist, April 1892, 553–555.

*Forceps—Extemporized.*—A very handy pair of forceps, suitable for lifting microscopical cover glasses, etc., can quickly be made from three wooden toothpicks. Break about one inch from one of them, throwing away the remainder, dip one of the ends of the other picks into liquid glue, place the short piece between the two ends (lengthwise), and wrap a thread or thin brass wire around that end.—National Druggist.

*Flasks and other Glass Vessels Coated with Copper.*—H. N. Warren generates from a small hydrogen apparatus a stream of antimony hydride, and allows the flame of the same to impinge upon the cold surface of the article in question. A deposit of metallic antimony is at once established, upon which a surface of metallic copper may be deposited by the usual method.—Chem. News, 1891, lxiv, 147.

*Gold or Silver Crucibles.*—H. N. Warren communicates the following method which, of course, may be used for making other implements than crucibles. A porcelain crucible of convenient size is painted over (on the outside) with an ethereal solution of gun-cotton, and after drying applying a solution of either argentic nitrate or of auric chloride. While still moist, the crucible is suspended over a strong solution of sulphurous acid, which will give off sufficient gas to reduce the metals; when this is accomplished the crucible is connected to a battery of required strength, and coated further by using one of the usual depositing solutions. When the metallic crucible is sufficiently thick, the film of gun-cotton is destroyed by heating over the flame of a Bunsen burner, when the porcelain crucible can be dropped out.—Chem. News, 1891, lxiv, 147.

*Platinum Crucibles.*—H. N. Warren recommends to make them from a circular piece of platinum foil of the required size, fold it twice, the same as for a paper filter, and open it. It is as serviceable as a costly crucible, and after the operations have been performed it may be flattened out, and used as foil. Chem. News, 1891, lxiv, 146.

*Dropper.*—Traube and Kattendidt have patented a dropper which is stated to insure uniformity in the size of the drops. The illustration, which see in Chem. Zeitg., July 1891, 962, or Am. Drug., 1891, 301, is easily understood.

*Powder-Folder.*—F. R. Guentherodt has devised a powder-folder which is exceedingly simple. It is a square block of wood with the faces hollowed or scalloped out so that the edges stand out boldly. Of course, this folder can not be adjusted. It can also be made of nickel-plated brass. —Pharm. Era, 1892.

*A Handy Pocket Vial.*—A long, flat-oval vial of the capacity of four teaspoonfuls, just adapted for the upper vest pocket, has been in the market for some time. It is very convenient for business men and travelers to carry a sufficient supply of medicine to last them for a day or so, while absent from home.—Am. Drug., July 1891, 219.

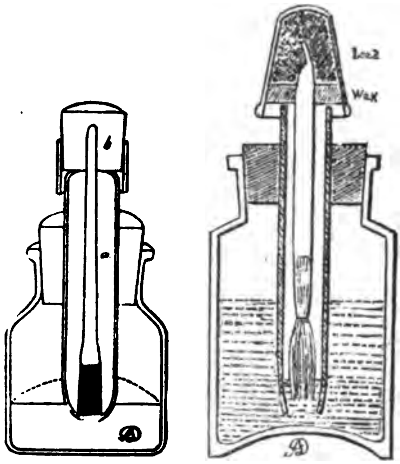
*Ointment—Atomizers.*—Burroughs, Wellcome & Co. have designed an atomizer for the application of antiseptic medicaments to the naso-pharyngeal mucous membranes; said medicaments to be dissolved in paraffin oil.—Chem. Drug., Aug. 1891, 344.

*Show-Bottle.*—Leon Fink has devised the following combination of colors for a six-color bottle. A tall, stoppered glass cylinder is measured, and equal volumes of the following liquids cautiously poured down the sides of the cylinder so as not to mix. The lowest layer is formed of chloroform colored green by maceration with grass; the next liquids are: castor oil colored red by alkanet; alcohol diluted with water to specific gravity of 0.935, uncolored; cod-liver oil; alcohol colored by anilin purple or blue. The colors must not be too deep. By starting with mercury and finishing with benzin, the list of superimposed liquids may be increased and varied, avoiding, of course, to bring two liquids in contact which react upon one another.—Druggist's Bulletin.

*Mucilage Bottle.*—A mucilage bottle which prevents evaporation, and overcharging of the brush, is suggested by a writer in the Bulletin of Pharmacy, and illustrated herewith (Fig. 1). A description is hardly requisite. We have to sugggest a modification of the brush handle, as shown in Fig. 2, and which consists in the use of a weighted thimble for a cap. Tinfoil or lead enough to fill about half of a cheap thimble is first packed about the handle, and the whole held in place by a layer of sealing wax. Such an arrangement will enable the gum brush to be laid on the table without the brush touching, the taper of the thimble raising it well above the horizontal. By filing a hole near the bottom of the glass tube, the mucilage

will rise to that point only, even when the bottle is full, so that the brush will always take up the same amount. The relative size of the tube is better shown in Fig. 1.

FIG. 9.




Mucilage Bottle.

*Paste for Parchment Paper.*—The best paste is a mixture of a warm 15 per cent. solution of gelatin with a 3 to 5 per cent. solution of potassium bichromate; to be kept protected from light. This paste has to be liquefied on a water-bath, and applied to the thoroughly damp parchment-paper; dry as quickly as possible.—Pharm. Post, 1891, 689.

*Label Paste.*—Frank recommends to use a ten per cent. solution of borax for making the paste, instead of so much water.—Rundschau, Prag., 1892, 276.

*Gummed Labels—Moistener.*—Vomacka cuts a piece of thick felt in the shape of a broad spatula, and fastens it to a convenient handle with two strips of tin or sheet iron. This "felt-brush" needs wetting only twice a day, and is used as an ordinary paste brush on gummed labels.—Pharm. Post, 1891, 1042.

## B. PREPARATIONS.

### GENERAL SUBJECTS.

*Conveniences in the Pharmacy.*—Clement B. Lowe calls attention to conveniences which he has introduced in his store, several of which deserve a place here:

First he notices what is found in so few American stores, the necessity of a thorough indexing (cataloguing), which not only is of assistance to

the new clerk, but also informs the owner whether a certain drug or preparation is, or is not, in his store. The drugs which are sold by weight should be kept handy to the scales, and the liquids convenient to the prescription counter. In the neighborhood of the pill tile, several bottles with sprinkler top, containing the different dusting powders (licorice root, starch, gum arabic, etc.), and also glycerites of starch and of tragacanth, in pots, should be kept. The glass labels of the shelf-ware containing preparations poisonous in small doses have a black background, the others a white one. Lowe keeps two ointment tiles, one painted black upon the back and the other white. The containers for ointments largely in use have the lids provided with a slot for the spatula; he thinks that hard rubber spatulas, for mixing ointments which act upon metals, would be a great convenience. Lowe thinks that the "noisy" poison devices (bells, etc.) will inform the customer, too, that some poison is to be used, and are therefore undesirable.—Am. Journ. Pharm., 1892, 14–17.

*Portable Pharmacy.*—A. Tonger (Berlin) has devised a novelty in portable pharmacy in the shape of a walking stick of cane (bamboo), the hollow parts of which serve as receptacles for sundry small vials of medicine.—Chem. Zeitg. (Rep.), 1891, 358.

*Adulteration in New York State.*—From the report of the Committee on Adulteration we gather that of 68 samples of spirit of nitrous ether 47 merited unqualified condemnation; the amount of ethyl nitrite in the 68 samples varied from 0.06 to 8.06. 76 samples of dilute acetic acid varied in strength from 0.80 to 29.80 (should be 6.12); 11 samples being too strong and 34 much too weak. Of 46 samples of Hoffmann's anodyne 12 only were fairly satisfactory; 34 contained no ethereal oil. Stronger ether was satisfactory in 17, and inferior in 12 instances. Diluted hydrobromic acid varied in strength from 0.60 to 14.40. Diluted hydrochloric acid, from 3 to 31 per cent. Of 13 samples of magnesia 12 contained sufficient carbonate to effervesce on addition of an acid. Of 9 samples of potassium bromide 6 were good, and of the iodide only 3 out of 15 were good. Fourteen of twenty samples of saffron were safflower. Of 30 seidlitz powders half were short weight.—Proc. N. Y. Phar. Assoc.

*Crystallized Sugar or Salts—Removed from Bottles.*—Attention is again called to an apparently forgotten method, which consists in completely filling the bottle with water, place over the mouth a strip or square of paper, inverting the bottle, placing it upright in a vessel of water, and withdraw the paper. After a shorter or longer period the sugar will either have dissolved, or loosened from the bottom. By noting the weight of the bottle before and after the removal of the sugar, the weight of the sugar is arrived at by difference. In the same way with salts.—Drug. Circ., 1891, 228, from Schweiz. Wochens. Pharm.

*Incompatibilities in Prescriptions.*—E. B. Stuart communicates the fol-

lowing prescription, with comments, as a good specimen of what pharmacists often have to compound, as well as they can:

| | |
|---|---|
| Tincturæ ferri chloridi | 1½ drachms. |
| Sodii hyposulphitis | 1½ drachms. |
| Potassii chloratis | 3 drachms. |
| Quininæ sulphatis. | 15 grains. |
| Aquæ | 2 fluid ounces. Mix. |

Stuart shows that the result would be: ferric chloride, ferric oxychloride, precipitated sulphur, sodium sulphate, sodium chloride, potassium sulphate, potassium chloride, potassium chlorate, and quinine chlorate. The question naturally arises, what the physician really intended to give.—Apothecary, Nov. 1891, 15.

*Galenical Preparations—Presence of Copper.*—F. W. Haussmann has examined fluid extracts, solid extracts and powdered extracts for the presence of copper, and found traces of it in nearly all of the samples, by the rough test with a brightly polished steel spatula, especially if the fluid, respectively the solution, had been previously acidulated a little, the time of contact varying from thirty minutes to six or eight hours. The cause is simply the corrosive action of the menstruum, or extractive liquid, upon the copper vessels of the laboratory, which in large laboratories cannot be avoided. The remedy is obviously for the pharmacist to make extracts, etc., himself, with avoidance of metallic vessels, which, however much to be desired, under present circumstances cannot be done.—Am. Jour. Pharm., 1892, 7–11.

*National Formulary—Remarks.*—Francis Hemm argues for the general adoption of the National Formulary, and shows that most of the objections made against it are based on misunderstanding. He especially shows that the preliminary cost and trouble in making the so-called "basic" preparations are relatively insignificant; the total absolutely necessary number of preparations being 23, and their cost not quite $15.—Drug. Circ., 1891, 201, from Proc. Missouri Pharm. Association.

Some preparations from the German and British *Unofficinal Formularies* will be found under their proper headings.

*Pharmacy in Germany.*—At the close of 1891 the number of pharmacies in Germany was 4892, which will average 0.99 pharmacies to every 10,000 inhabitants. The number of physicians was 19,630, about 1 to every 2,500.—Schweiz. Woch., 1892, 18.

*Pharmacy in Turkey.*—According to P. Apery, Constantinople contains 267 pharmacies, 118 Turkish (Greek nationality), 93 Armenian, 23 Jews, 19 Greeks, 5 Italians, 3 Austrians, 2 French, 2 Roumanians, 1 English, 1 Persian. Constantinople contains 800,000 inhabitants.—Pharm. Zeits. Russl., 1892, 63.

*Prescriptions—"Recipe."*—An interesting disquisition upon the origin of

the cabalistic-looking sign which commences prescriptions, forms the subject of a letter from Dr. O. A. Wall, in Chem. and Drug., July 1891, 159.

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TABULAR EXHIBIT OF DOSES OF PREPARATIONS OF VARIOUS STRENGTHS.

Estimated from the Doses of the Drugs.

| Percentages of Preparations—Drug at 100. | | Dose of Drug in Grains or Minims. | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 gr. | 2 | 3 | 5 | 10 | 15 | 20 | 30 | 60 | 120 |
| Tincts. | 5 | 20 | 40 | 60 | 100 | 200 | 300 | 400 | 600 | | |
| Tincts., Spirits, Tritur. | 10 | 10 | 20 | 30 | 50 | 100 | 150 | 200 | 300 | 600 | |
| Tincts., Syrups | 20 | 5 | 10 | 15 | 25 | 50 | 75 | 100 | 150 | 300 | 600 |
| Tincts. | 50 | 2 | 4 | 6 | 10 | 20 | 30 | 40 | 60 | 120 | 240 |
| Fl. Exts. | 100 | 1 | 2 | 3 | 5 | 10 | 15 | 20 | 30 | 60 | 120 |
| Abstracts | 200 | ½ | 1 | 1½ | 2½ | 5 | 7½ | 10 | 15 | 30 | 60 |
| Extracts | 400 | ¼ | ½ | ¾ | 1¼ | 2½ | 3¾ | 5 | 7½ | 15 | 30 |
| Extracts | 500 | 1/5 | 2/5 | 3/5 | 1 | 2 | 3 | 4 | 6 | 12 | 24 |
| Extracts | 1000 | 1/10 | 1/5 | 3/10 | ½ | 1 | 1½ | 2 | 3 | 6 | 12 |
| Resins | 2000 | 1/20 | 1/10 | 3/20 | ¼ | ½ | ¾ | 1 | 1½ | 3 | 6 |

According to the Metric System.

| Percentage of Preparations (Drug 100). | Dose of Drug in Grams and Equivalents. | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 0.01 1 centig. | 0.05 5 centig. | 1.06 1 grain. | 0.1 1 decig. | 0.2 2 decig. | 0.3 5 grains. | 0.5 ½ gram. | 0.65 10 gr'ns. | 1 gram. 15½ grs. | 3 grams. 46 grs. |
| Tinct.. 5 | 1/5 C.C. | 1 C.C. | 1 1/5 C.C. | 2 C.C. | 4 C.C. | 6 C.C. | 10 C.C. | 13 C.C. | 20 C.C. | 60 C.C. |
| Tinct.. 10 | 1/10 " | 1/2 " | 6/10 " | 1 " | 2 " | 3 " | 5 " | 6½ " | 10 " | 30 " |
| Tinct.. 20 | 1/20 " | 1/4 " | 3/10 " | ½ " | 1 " | 1½ " | 2½ " | 3¼ " | 5 " | 15 " |
| Tinct.. 50 | 1/50 " | 1/10 " | ⅛ " | 1/5 " | 2/5 " | 3/5 " | 1 " | 1⅓ " | 2 " | 6 " |
| Fl.Exts. 100 | 1/100 " | 1/20 " | 1/18 " | 1/10 " | 1/5 " | ⅓ " | ½ " | ⅔ " | 1 " | 3 " |
| Abst... 200 | Gram. 0.005 | Gram. 0.025 | Gram. 0.03 | Gram. 0.05 | Gram. 0.1 | Gram. 0.15 | Gram. 0.25 | Gram. 0.32 | Gram. 0.05 | Gram. 1.5 |
| Extr. .. 400 | 0.0025 | 0.012 | 0.015 | 0.025 | 0.05 | 0.075 | 0.125 | 0.16 | 0.25 | 0.75 |
| Extr. .. 500 | 0.002 | 0.01 | 0.012 | 0.02 | 0.04 | 0.06 | 0.1 | 0.12 | 0.2 | 0.6 |
| Extr. ..1000 | 0.001 | 0.005 | 0.006 | 0.01 | 0.02 | 0.03 | 0.05 | 0.06 | 0.1 | 0.3 |
| Resin...2000 | ½ mg. | 2½ mg | 3 mg. | ½ ctg. | 1 ctg. | 1½ ctg. | ½ dcg | 6 ctg. | 1 decg. | 3 decg. |

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TABULAR EXHIBIT OF DOSES OF PREPARATIONS OF VARIOUS STRENGTHS.

Estimated from the Doses of the Drugs.

| Percentages of Preparations—Drug at 100. | | Dose of Drug in Grains or Minims. | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 gr. | 2 | 3 | 5 | 10 | 15 | 20 | 30 | 60 | 120 |
| Tincts. | 5 | 20 | 40 | 60 | 100 | 200 | 300 | 400 | 600 | | |
| Tincts., Spirits, Tritur. | 10 | 10 | 20 | 30 | 50 | 100 | 150 | 200 | 300 | 600 | |
| Tincts., Syrups | 20 | 5 | 10 | 15 | 25 | 50 | 75 | 100 | 150 | 300 | 600 |
| Tincts. | 50 | 2 | 4 | 6 | 10 | 20 | 30 | 40 | 60 | 120 | 240 |
| Fl. Exts. | 100 | 1 | 2 | 3 | 5 | 10 | 15 | 20 | 30 | 60 | 120 |
| Abstracts | 200 | ½ | 1 | 1½ | 2½ | 5 | 7½ | 10 | 15 | 30 | 60 |
| Extracts | 400 | ¼ | ½ | ¾ | 1¼ | 2½ | 3¾ | 5 | 7½ | 15 | 30 |
| Extracts | 500 | 1/5 | 2/5 | 3/5 | 1 | 2 | 3 | 4 | 6 | 12 | 24 |
| Extracts | 1000 | 1/10 | 1/5 | 3/10 | ½ | 1 | 1½ | 2 | 3 | 6 | 12 |
| Resins | 2000 | 1/20 | 1/10 | 3/20 | ¼ | ½ | ¾ | 1 | 1½ | 3 | 6 |

ACCORDING TO THE METRIC SYSTEM.

| Percentage of Preparations (Drug 100). | Dose of Drug in Grams and Equivalents. | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 0.01 1 centig. | 0.05 5 centig. | 1.06 1 grain. | 0.1 1 decig. | 0.2 2 decig. | 0.3 5 grains. | 0.5 ½ gram. | 0.65 10 gr'ns. | 1 gram. 15½ grs. | 3 grams. 46 grs. |
| Tinct.. 5 | $\frac{1}{5}$ C.C. | 1 C.C. | $1\frac{1}{5}$ C.C. | 2 C.C. | 4 C.C. | 6 C.C. | 10 C.C. | 13 C.C. | 20 C.C. | 60 C.C. |
| Tinct.. 10 | $\frac{1}{10}$ " | $\frac{1}{2}$ " | $\frac{6}{10}$ " | 1 " | 2 " | 3 " | 5 " | 6½ " | 10 " | 30 " |
| Tinct.. 20 | $\frac{1}{20}$ " | $\frac{1}{4}$ " | $\frac{3}{10}$ " | ½ " | 1 " | 1½ " | 2½ " | 3¼ " | 5 " | 15 " |
| Tinct.. 50 | $\frac{1}{50}$ " | $\frac{1}{10}$ " | ⅛ " | $\frac{1}{5}$ " | $\frac{2}{5}$ " | $\frac{3}{5}$ " | 1 " | 1⅓ " | 2 " | 6 " |
| Fl.Exts. 100 | $\frac{1}{100}$ " | $\frac{1}{20}$ " | $\frac{1}{16}$ " | $\frac{1}{10}$ " | $\frac{1}{5}$ " | ⅓ " | ½ " | ⅔ " | 1 " | 3 " |
| Abst... 200 | Gram. 0.005 | Gram. 0.025 | Gram. 0.03 | Gram. 0.05 | Gram. 0.1 | Gram. 0.15 | Gram. 0.25 | Gram. 0.32 | Gram. 0.05 | Gram. 1.5 |
| Extr... 400 | 0.0025 | 0.012 | 0.015 | 0.025 | 0.05 | 0.075 | 0.125 | 0.16 | 0.25 | 0.75 |
| Extr... 500 | 0.002 | 0.01 | 0.012 | 0.02 | 0.04 | 0.06 | 0.1 | 0.12 | 0.2 | 0.6 |
| Extr...1000 | 0.001 | 0.005 | 0.006 | 0.01 | 0.02 | 0.03 | 0.05 | 0.06 | 0.1 | 0.3 |
| Resin...2000 | ½mg. | 2½mg | 3 mg. | ½ ctg. | 1 ctg. | 1½ctg. | ½dcg | 6 ctg. | 1 decg. | 3 decg. |

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Estimated from the Doses of the Drugs.

| Percentages of Preparations—Drug at 100. | | Dose of Drug in Grains or Minims. | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 gr. | 2 | 3 | 5 | 10 | 15 | 20 | 30 | 60 | 120 |
| Tincts. | 5 | 20 | 40 | 60 | 100 | 200 | 300 | 400 | 600 | | |
| Tincts., Spirits, Tritur. | 10 | 10 | 20 | 30 | 50 | 100 | 150 | 200 | 300 | 600 | |
| Tincts., Syrups | 20 | 5 | 10 | 15 | 25 | 50 | 75 | 100 | 150 | 300 | 600 |
| Tincts. | 50 | 2 | 4 | 6 | 10 | 20 | 30 | 40 | 60 | 120 | 240 |
| Fl. Exts. | 100 | 1 | 2 | 3 | 5 | 10 | 15 | 20 | 30 | 60 | 120 |
| Abstracts | 200 | ½ | 1 | 1½ | 2½ | 5 | 7½ | 10 | 15 | 30 | 60 |
| Extracts | 400 | ¼ | ½ | ¾ | 1¼ | 2½ | 3¾ | 5 | 7½ | 15 | 30 |
| Extracts | 500 | $\frac{1}{5}$ | $\frac{2}{5}$ | $\frac{3}{5}$ | 1 | 2 | 3 | 4 | 6 | 12 | 24 |
| Extracts | 1000 | $\frac{1}{10}$ | $\frac{1}{5}$ | $\frac{3}{10}$ | ½ | 1 | 1½ | 2 | 3 | 6 | 12 |
| Resins | 2000 | $\frac{1}{20}$ | $\frac{1}{10}$ | $\frac{3}{20}$ | ¼ | ½ | ¾ | 1 | 1½ | 3 | 6 |

ACCORDING TO THE METRIC SYSTEM.

| Percentage of Preparations (Drug 100). | Dose of Drug in Grams and Equivalents. | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 0.01 1 centig. | 0.05 5 centig. | 1.06 1 grain. | 0.1 1 decig. | 0.2 2 decig. | 0.3 5 grains. | 0.5 ½ gram. | 0.65 10 gr'ns. | 1 gram. 15½ grs. | 3 grams. 46 grs. |
| Tinct.. 5 | 1/5 C.C. | 1 C.C. | 1 1/5 C.C. | 2 C.C. | 4 C.C. | 6 C.C. | 10 C.C. | 13 C.C. | 20 C.C. | 60 C.C. |
| Tinct.. 10 | 1/10 " | 1/2 " | 6/10 " | 1 " | 2 " | 3 " | 5 " | 6½ " | 10 " | 30 " |
| Tinct.. 20 | 1/20 " | 1/4 " | 3/10 " | ½ " | 1 " | 1½ " | 2½ " | 3¼ " | 5 " | 15 " |
| Tinct.. 50 | 1/50 " | 1/10 " | 1/8 " | 1/5 " | 2/5 " | 3/5 " | 1 " | 1⅓ " | 2 " | 6 " |
| Fl.Exts. 100 | 1/100 " | 1/20 " | 1/18 " | 1/10 " | 1/5 " | ⅓ " | ½ " | ⅔ " | 1 " | 3 " |
| Abst... 200 | Gram. 0.005 | Gram. 0.025 | Gram. 0.03 | Gram. 0.05 | Gram. 0.1 | Gram. 0.15 | Gram. 0.25 | Gram. 0.32 | Gram. 0.05 | Gram. 1.5 |
| Extr... 400 | 0.0025 | 0.012 | 0.015 | 0.025 | 0.05 | 0.075 | 0.125 | 0.16 | 0.25 | 0.75 |
| Extr... 500 | 0.002 | 0.01 | 0.012 | 0.02 | 0.04 | 0.06 | 0.1 | 0.12 | 0.2 | 0.6 |
| Extr...1000 | 0.001 | 0.005 | 0.006 | 0.01 | 0.02 | 0.03 | 0.05 | 0.06 | 0.1 | 0.3 |
| Resin...2000 | ½ mg. | 2½ mg | 3 mg. | ½ ctg. | 1 ctg. | 1½ ctg. | ½ dcg | 6 ctg. | 1 decg. | 3 decg. |

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|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 gr. | 2 | 3 | 5 | 10 | 15 | 20 | 30 | 60 | 120 |
| Tincts. | 5 | 20 | 40 | 60 | 100 | 200 | 300 | 400 | 600 | | |
| Tincts., Spirits, Tritur. | 10 | 10 | 20 | 30 | 50 | 100 | 150 | 200 | 300 | 600 | |
| Tincts., Syrups | 20 | 5 | 10 | 15 | 25 | 50 | 75 | 100 | 150 | 300 | 600 |
| Tincts. | 50 | 2 | 4 | 6 | 10 | 20 | 30 | 40 | 60 | 120 | 240 |
| Fl. Exts. | 100 | 1 | 2 | 3 | 5 | 10 | 15 | 20 | 30 | 60 | 120 |
| Abstracts | 200 | 1/2 | 1 | 1 1/2 | 2 1/2 | 5 | 7 1/2 | 10 | 15 | 30 | 60 |
| Extracts | 400 | 1/4 | 1/2 | 3/4 | 1 1/4 | 2 1/2 | 3 3/4 | 5 | 7 1/2 | 15 | 30 |
| Extracts | 500 | 1/5 | 2/5 | 3/5 | 1 | 2 | 3 | 4 | 6 | 12 | 24 |
| Extracts | 1000 | 1/10 | 1/5 | 3/10 | 1/2 | 1 | 1 1/2 | 2 | 3 | 6 | 12 |
| Resins | 2000 | 1/20 | 1/10 | 3/20 | 1/4 | 1/2 | 3/4 | 1 | 1 1/2 | 3 | 6 |

ACCORDING TO THE METRIC SYSTEM.

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| Tinct.. 5 | 1/5 C.C. | 1 C.C. | 1 1/5 C.C. | 2 C.C. | 4 C.C. | 6 C.C. | 10 C.C. | 13 C.C. | 20 C.C. | 60 C.C. |
| Tinct.. 10 | 1/10 " | 1/2 " | 6/10 " | 1 " | 2 " | 3 " | 5 " | 6½ " | 10 " | 30 " |
| Tinct.. 20 | 1/20 " | 1/4 " | 3/10 " | ½ " | 1 " | 1½ " | 2½ " | 3¼ " | 5 " | 15 " |
| Tinct.. 50 | 1/50 " | 1/10 " | ⅛ " | 1/5 " | 2/5 " | 3/5 " | 1 " | 1⅓ " | 2 " | 6 " |
| Fl.Exts. 100 | 1/100 " | 1/20 " | 1/18 " | 1/10 " | 1/5 " | ⅓ " | ½ " | ⅔ " | 1 " | 3 " |
| Abst... 200 | Gram. 0.005 | Gram. 0.025 | Gram. 0.03 | Gram. 0.05 | Gram. 0.1 | Gram. 0.15 | Gram. 0.25 | Gram. 0.32 | Gram. 0.05 | Gram. 1.5 |
| Extr... 400 | 0.0025 | 0.012 | 0.015 | 0.025 | 0.05 | 0.075 | 0.125 | 0.16 | 0.25 | 0.75 |
| Extr... 500 | 0.002 | 0.01 | 0.012 | 0.02 | 0.04 | 0.06 | 0.1 | 0.12 | 0.2 | 0.6 |
| Extr...1000 | 0.001 | 0.005 | 0.006 | 0.01 | 0.02 | 0.03 | 0.05 | 0.06 | 0.1 | 0.3 |
| Resin...2000 | ½mg. | 2½mg | 3 mg. | ½ ctg. | 1 ctg. | 1½ctg. | ½dcg | 6 ctg. | 1 decg. | 3 decg. |

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*Patent Medicines—A Century.*—Dr. John S. Billings has given a humorous review of the patenting of medicines during the last hundred years, for which see American Druggist, August, 1891, 236.

*The Patent Medicine Trade.*—An editorial in the American Druggist (1891, 274) contains the following remarks which deserve a place here:

"Let us consider how other proprietary goods are handled. John Doe is the owner and manufacturer of a patented hay rake. He does not expect every country store-keeper to promote his business interests and the sale of his rake as a matter of good-will or without sufficient pecuniary consideration to make the business profitable. Does the country store-keeper sign a contract not to sell the rake for less than his neighbor? Not if he knows it; but he holds a contract signed by John Doe, in virtue of which he has the *exclusive* sale of that rake in that locality, and agrees only to keep a stock on hand, and not to charge *more* than a specified price for it. John Doe, on the other hand, accepts the obligation to protect the retailer in his *exclusive right* to the sale of that rake in *that territory*. Such

contracts are recognized by law and custom, and are the ones which control the handling of pretty nearly all patents excepting proprietary medicines. Any attempt to improve the trade in this particular, short of accepting and practising the business methods of other dealers, must prove utterly worthless. If you think there is a chance to make a profitable business out of the sale of somebody's 'sarsaparilla' in your town, pay him something for the privilege of handling it, and take his written contract that he will furnish it to no other dealer within a specified territory, nor allow other dealers in adjoining territories to supply it. Then you have some sort of hold upon your business which people of ordinary intelligence will understand; and when you want to sell out your stock and good-will you have something tangible to dispose of, and the courts will help you defend your proprietorship. As it is now, you are doing business at your own risk for another man's benefit, and if you venture to protect yourself by the measures the 'other man' has been proposing of late, you will discover that they are either contrary to law or protect only the other man."

*Pound.*—F. H. Taylor published an interesting illustrated historical article on the pound weight, starting from the ancient Egyptians, in the Western Druggist, 1892, 175.

*Value of "Spoonful," and Similar Expressions.*—According to Sueddeutsche Apoth. Zeitung, 1891, 404, a tablespoonful is considered equivalent to 15 gm., a dessertspoonful to 8 gm., a teaspoonful to 4 gm., and a "knife-point" (often met with in German directions) to 0.2–0.4 gm.

*Spoons.*—H. Keyl has patented an adjustable measuring-spoon with scraper attachment (to even the surface), which appears quite handy.—Pharm. Centralhalle.

## SPECIAL SUBJECTS.

### ACETA.

*Vinegars—Medicinal.*—M. C. Traub confirms the observation made by Dieterich that the percentage of acetic acid gradually decreases, and, as might be expected, acetic ether is formed.—Am. Jour. Pharm., 1892, 143, from Schweiz. Woch., 1892.

### ACIDA.

*Acids—Strength.*—K. Immendoerffer points out that the results of titration seldom agree with the specific gravity, due, no doubt, to the inaccurate instruments of precision usually found, and he therefore suggests that the Pharmacopœia give a limit instead of a single definite specific gravity and saturating power. For instance, *dilute acetic acid* (of the Ph. German.): Sp. gr. 1.410 to 1.420; 5 c.c., to saturate 25.9 to 26.1 c.c. of potassa solution (Ph.G.).—Pharm. Centralh., 1892, 148.

*Acidum Gallicum.*—Gallic acid, when heated for several hours to 60° C., with zinc powder and ammonia solution, is converted into benzoic

acid, according to C. E. Guignet (*Compt. rend.*, 113, 200). The same result is produced by heating gallic acid with zinc and dilute sulphuric acid. *Tannin* treated in a similar manner, is first transformed into gallic acid, and yields finally benzoic acid.—Am. Jour. Pharm., 1892, 79.

*Oxidation of Gallic Acid.*—By Carl Böttinger (Lieb. Ann., 260, 337–348).—Berichte, 1891, 24, 117.

*Gallotannic Acid and Gallic Acid.*—By J. Napier Spence (Soc. Chem. Ind., 9, 1114–1115).—Berichte, 1891, 24, 160.

*The Antiseptic Action of Gallic Acid.*—By Ph. Limbourg (Zeitschr. f. Physiol. Chem., 13, 196–201).—Berichte, 1891, 24, 219.

*Transformation of Gallic Acid and Tannin into Benzoic Acid.*—(Note by Ch. En. Guignet in Compt. rend., 1891, 113, 200).—Chem. Zeitung, 1891, 225, 226.

*Acidum Tannicum—Tannin Extraction.*—A patent has been granted the firm of J. D. Riedel, of Berlin, for the following method: The properly comminuted and, if necessary, dried material is placed in a suitable continuous extraction apparatus and exhausted with a solvent for resins, waxes, fats and chlorophyll like ether, carbon disulphide, amyl alcohol, benzol, benzin, etc.; by heating, the solvent is completely removed from the material and the tannin then extracted by percolation with water; by dialysis the crystallizable salts and gallic acid are removed as rapidly as possible from the percolate to prevent change in the tannin, and then the dialyzed solution is evaporated.—Pharm. Centralhalle, 1891, 419.—Am. Jour. Pharm., 1891, 462.

*Reagent for Tannin.*—Baemes (Monit. de la Pharm., 1891, 1006) uses as a reagent for tannin a solution containing 10 c.c., 1 gm., sodium tungstate and 2 gm. sodium acetate. This yields with tannin in acid or alkaline solution a straw-colored precipitate which is insoluble in water. The reaction is said to be very sensitive.—Am. Jour. Pharm., 1892, 77.

*Estimation of Sugar and Tannin in Wines.*—T. H. Vogel gives the results of his experiments in Zeit. ang. Chem., 1891, 44–69; Jour. Chem. Soc., 1891, 1557.—Am. Jour. Pharm., 1892, 95–97.

*The Tannins.*—A monograph on the history, preparation, properties, methods of estimation and uses of the vegetable astringents, with an index to the literature of the subject. By Henry Trimble, Ph.M., Professor of Analytical Chemistry in the Philadelphia College of Pharmacy. Vol. 1, Philadelphia, J. B. Lippincott Company, 1892, pp. 168.

*A Derivative of Tannin.*—By C. Böttinger (Arch. d. Pharm., 229, 439–447). I. Compound of tannin with acetic ether. II. Hydrotannic acid and isohydrotannic acid.—Berichte, 1891, 24, 962.

*Tannin—A New Test for.*—By M. Böttinger.—When equal parts of tannin and phenyl-hydrazine in solution are heated to 100° C., the result-

ing product is soluble in hot water and in ether, and assumes a greenish-blue coloration when cautiously treated with soda lye. The author has not succeeded in obtaining similar products from oak-wood extract or from tan-bark.—The Drug. Circ. and Chem. Gaz., 1891, 228.

*Tannin in Barks, etc.—Determination of, by Precipitation with Gelatin.*—By S. J. Hinsdale (N. C. Pharm. Assoc. Proc.).—Western Drug.. 1891, 445.

## AQUÆ.

*Carbonic Acid—Soda Water.*—To produce one ton of carbonic acid gas requires 3 tons of whiting; 3 tons sulphuric acid; and 10 tons water. Or: 2 tons of bicarbonate of sodium; 1 ton 4 cwt. sulphuric acid; and 3 tons water.—Chem. and Drug., July 25, 1891, 151.

*Soda Water Fountain—Marbles.*—An instructive article by Thomas Warwick on the different kinds of marble employed for the ornamental part of the apparatus, and the best way of taking care of it, will be found in Drug. Circ., 1892, 126, from Drug. Bulletin.

*Chlorine Water—Assay.*—L. Winkler estimates the chlorine rapidly by adding 50 gm. of the chlorine water to an aqueous solution of 0.16 gm. of potassium iodide in a little water, and shaking well. If the liquid remains perfectly clear, the chlorine water is of full strength (4 per cent.); if, however, a separation of iodine takes place, the chlorine water is too weak: and if the liquid, after shaking, still smells of chlorine, then the water is stronger than it should be. The reaction is the following: $I + 5Cl + 3H_2O = HIO_3 + 5HCl$.—Pharm. Post, 1892, 477.

*Aqua Chloroformi—German Unofficinal Formulary.*

| | |
|---|---|
| Chloroform | 1 part. |
| Water | 1000 " |

Dissolve. Protect from light.

—Amer. Drug., 1891, 297.

*Chloroform Water—In Diphtheria.*—Loeffler highly recommends chloroform water as a gargle in diphtheria. He states that it is not only quite a specific, but that it is less poisonous than potassium chlorate. As to the strength, he prefers a cold saturated solution in water.—Apoth. Zeit., 1892, 4.

*Aqua Cosmetica Kummerfeldi—German Unofficinal Formulary.*—

| | |
|---|---|
| Camphor, in fine powder | 1 part. |
| Acacia, in fine powder | 2 parts. |
| Precipitated sulphur | 12 " |
| Rose water | 40 " |
| Lime water | 45 " |

Triturate the solids with the rose-water gradually added, and finally mix with the lime water.

The preparation is to be shaken before use.

*Aqua Dentifricia Bototi—German Unofficinal Formulary.*—

| | |
|---|---|
| Cloves, in coarse powder | 30 parts. |
| Ceylon cinnamon, in coarse powder | 30 " |
| Anise, in coarse powder | 30 " |
| Cochineal, in coarse powder | 20 " |
| Alcohol | 2,000 " |
| Oil of peppermint | 15 " |

Macerate the solids with the alcohol during one week, frequently shaking. Filter, and in the filtrate dissolve the oil of peppermint.—Am. Drug., 1891, 297.

*Aqua Ophthalmica Romershauseni—German Unofficinal Formulary.*—

| | |
|---|---|
| Tincture of fennel | 1 part. |
| Water | 5 parts. |

Mix them. A milky, faintly green liquid.

(Tincture of fennel is prepared by pouring 150 parts of alcohol upon 30 parts of bruised fennel, then adding 5 parts of oil of fennel, macerating forty-eight hours, and filtering.)

*Aqua Rosæ Triplex.—Germ. Unoff. Form.*

| | |
|---|---|
| Oil of rose | 12 drops. |
| Water, lukewarm | 1 liter. |

Add the oil to the water, shake for some time, and filter. The product should be turbid.

*Aqua Sedativa Raspail.—Germ. Unoff. Form.*

| | |
|---|---|
| Sodium chloride | 60 parts. |
| Water | 1,000 " |
| Spirit of camphor | 10 " |
| Water of ammonia | 60 " |

Dissolve the sodium chloride in the water, then add the spirit of camphor and ammonia. The product should be turbid. It should be shaken before being dispensed.

[Our National Formulary gives different proportions: the ammonia is there about double the weight of the sodium chloride.]

*Creosote—Soda Water.*—1 to 2 gm. of creosote, 50 to 100 gm. of brandy, 300 gm. of simple syrup, 30 to 40 drops of spirit of peppermint, and 2,000 gm. of soda water. Mix.—Pharm. Post, 1891, 1106, from Med. Chir. Ctralb.

*Water.*—See also under *Hydrogen* in "Chemistry."

*Distilled Waters—Reactions.*—L. Viron distinguishes the various dis-

tilled waters by their behavior to what he terms "sulphocarbazol reagent," which is a solution of 0.15 gm. of carbazol in 100 c.c. of perfectly pure sulphuric acid. The acid is heated for several minutes, in order to free it from all traces of nitrous compounds, which would interfere with the delicacy of the reaction. To three c.c. of the yellowish, faintly fluorescent solution, add, drop by drop, sufficient of the water to be examined for precipitation, which will require about 4 c.c. The color of the precipitate and of the supernatant liquid will be found to vary with many of the waters. For instance, cinnamon-water turns red, and gives a rust-brown precipitate, whilst cherry-laurel water, with a similar coloration, gives a brown precipitate which soon turns dark-blue; the difference in the coloration of several of the waters, however, is very slight.—Pharm. Centralhalle, 1891, 449, from Journ. Pharm. Chim.

*Flocculent Deposits.*—See under *Liquores*.

*Elder-flower Water—Artificial.*—P. W. Bedford gives the following formula for an imitation of elder-flower water, which will do good service in eye-washes. Caraway water and orange-flower water, of each one ounce; rose water, six ounces. Mix. The orange-flower and rose waters should be distilled.—Pharm. Record, 1891, xii, 83.

### CACHETS.

*Cachets.*—Morstadt has devised an apparatus which in some respects differs from that of Limousin, especially by being provided with an additional plate which prevents any of the powder going on the edge of the cachets.—Chem. Drug., August, 1891, 344.

### CHARTÆ, INCLUDING TEST PAPERS.

*Charta Antasthmatica—German Unofficinal Formulary.*—

| | |
|---|---|
| Potassium nitrate | 17 parts. |
| Extract of stramonium (inspissated) | 10 " |
| Sugar | 20 " |
| Water, hot | 100 " |

Dissolve the solids in the hot water, strain the solution, impregnate white filtering paper with it, and dry it.

—Am. Drug., 1891, 297.

*Albumin Test-Paper.*—This test-paper in reality consists of two papers: one for acidifying the urine is impregnated with a concentrated solution of citric acid; the other, for precipitating the albumen, consists of paper impregnated with a three per cent. solution of mercuric chloride, to which has been added a twelve to fifteen per cent. solution of potassium iodide. The urine is first acidified by shaking with a small strip of the citric-acid paper, and then shaken with the potassiò-mercuric-iodide paper, when the albumen separates as a flocculent mass. It will be noticed that the proportion of potassium iodide is considerably less than that made in the old way,

but A. Erenberg has found that the new paper is much more sensitive. He states further, that the precipitate of mercuric iodide, due to the absence of an excess of potassium iodide, does not obscure the reaction.—Pharm. Centralh., 1892, 328.

*Azolitmin Test-Paper.*—R. Dietel, in preparing it, follows in the main the process of Stutzer (see Proceedings 1884, xxxii, 335), which, roughly stated, consists in exhausting litmus with water, faintly acidulating the solution with hydrochloric acid, mixing with sand, and evaporating to dryness, heating sufficiently to get rid of the hydrochloric acid, and keeping the azolitmin-sand in well-stoppered vials, removed from light. The test-paper is made by extracting 10 parts of this "sand" (equal to 5 parts of litmus) with 100 parts of hot water, adding a few drops of ammonia, and filtering. Dietel states that filtering paper is better for test-paper than the time-honored writing-paper; and applying a drop to the paper is more delicate than dipping. According to Dietel's experiments, the sensitiveness of litmus test-paper is greater than that given by Dieterich (Proceedings 1888, xxxvi., 230). Pharm. Zeitg., 1892, 7.

*Neutral Litmus Paper.*—K. Mays dialyzes an aqueous extract of commercial litmus, previously acidulated with hydrochloric acid; litmus is a colloid substance, and will in this manner be freed from saline and other impurities. Test-paper, prepared with dialyzed litmus, is very satisfactory.—Jour. Chem. Soc., 1891, 1549, from Verh. Naturw. Ver. Heidelberg.

"*Sublimated*" *Paper.*—A French pharmacist has devised paper impregnated with a solution of corrosive sublimate of a definite strength; each sheet or leaf containing exactly 0.5 gm. paper, is easier to carry than pastilles, and is not likely to be taken inwardly or even held in the mouth.—D. A. Apoth. Zeitg., Aug, 1891, 81.

See also *Paper*, under "Miscellaneous."

*Test-Paper.*—According to Bolletino Farmaceutico, the following test-paper is more sensitive than litmus paper. White filtering paper is dipped into tincture of turmeric (1 : 7), and after being completely dry, it is dipped into a 2 per cent. solution of potassa, and immediately rinsed in distilled water. After drying, the paper is cut into suitable sizes, and kept wrapped in tinfoil. It is so sensitive as to indicate hydrochloric acid in a dilution of 1 : 150,000; the best way in which to use this paper is to touch it with a glass rod dipped into the liquid to be examined.—Zeits. Oesterr. Apoth. Ver., 1892, 92.

## GOSSYPIUM.

*Sedox.*—This substitute for absorbent cotton, of unknown origin, is stated to be able to absorb fifteen times its weight of fluid; it is further stated to be non-irritating, and to be antiseptic.—Zeits. Oesterr. Apoth. Ver., 1892, 8.

## COLLODIA.

*Gun Cotton.*—J. G. Flint states that he has often been unsuccessful with the officinal formula, and recommends the following as perfectly reliable: Place 6 parts by weight of nitric acid in a stone jar, and pour to it 12 parts by weight of sulphuric acid. When the temperature has fallen to about 35° C., place the jar in a larger vessel, and surround it with broken ice. After the temperature has fallen to 15° C., take 1 part of absorbent cotton, loosen it well, and place a small portion at a time carefully on the surface of the acid, and with a clean glass rod press it below the surface. Keep the thermometer in the acid, and watch the temperature closely. If at any time it rises above 16.5° or 17° C., stop the addition of cotton until the temperature has fallen to 15° C. After five hours, remove the jar from the ice, drain off as much of the acids as possible, pressing the cotton with the glass rod. Protect the hands with rubber gloves, and take up the cotton in small portions, washing each quickly in cold water, moving the cotton about to avoid any rise in the temperature. Finally wring out well, and spread on clean boards to dry. Hot water for the washing must never be used. As to the keeping, the author directs to keep it in an open jar under distilled water. Tightly closed containers will make trouble. The acids may be used several times over.—Western Druggist, 1892, 206.

*Camphoid—Substitute for Collodion.*—W. Martindale proposes to use a solution of pyroxylin in a concentrated solution of camphor, known as Rubini's solution (camphor in equal weight of alcohol). This preparation, which he names "camphoid," dries in a few minutes and forms an elastic opaque film, which does not wash off. It forms a very cleanly base for iodoform, carbolic acid, resorcin, etc.—Pharm. Journ. Trans., April 1892, 831.

*Collodion of Iodol*—for covering small abrasions—is made by Pick of iodol 1, ether 5, and pyroxylin 0.5 gm.—Am. Journ. Pharm., July, 1891, 376.

*Collodium.*—In Pharm. Record, 1892, xiii, 25–27, will be found a list of forty different kinds of collodions, several of which have been printed in former volumes of the Proceedings. The following are new:

*Alkaloidal Collodions.*—Dissolve the alkaloids in oleic acid and incorporate with collodion (preferably the flexible). The strength to be varied to suit.

*Collodium Belladonnæ.*—B. Ph.C.—*Emplastrum Belladonnæ Fluidum.*

| | |
|---|---|
| Alcoholic extract of belladonna | 5 oz. |
| Spirit of camphor | 2½ fl. oz. Dissolve and add |
| Flexible collodion | sufficient to produce 1 pint (imperial). |

Set aside and decant.—Pharm. Jour. and Trans., July 25, 1890, 70.

M. Conroy states that on adding the flexible collodium to the camphor-

aceous belladonna solution, most of the extract is thrown down, and owing to the viscous nature of the mixture, it takes very long to settle. He recommends to form the collodium in the mixture by adding to the belladonna solution the requisite proportion of alcohol and ether (3 parts of ether and one part of rectified spirit, 0.838) shake up at intervals during one hour, pour off the clear solution, and dissolve in it the necessary amount of pyroxylin, castor oil and Canada balsam. Made in whichever way, it is an unsatisfactory article; of 2,187.5 grains of extract, 1,903.2 grains remain undissolved.—Chem. Drug., Nov., 1891, 610.

J. Linford thinks that the reason why so small a percentage of the alkaloids is extracted lies in the fact of their being present as salts, and proposes, therefore, the addition of ammonia, which would liberate the alkaloids so that the ethereal solvent would extract them completely. Two fluiddrachms of ammonia (0.880) would be sufficient for the 2½ fluidounces of spirit of camphor directed in the formula.—Pharm. Journ. Trans., Nov., 1891, 384.

J. C. Umney corroborates the observations of Conroy, regarding the great variety in the commercial extracts of belladonna. He examined nine extracts (3 rad. alcoh. Ph. Br., 3 belladonna Ph. Br., 3 fol. alcoh. Ph. Br.) as to the amounts of extract and alkaloid dissolved in a similar liquid:

PER CENT.

| Extract. | Loss at 100 C. | Alkaloid calc. on dried extr. | Extr. soluble in collod. Ph. Br. process. | Alkaloid fr. the dissolved extract. | Alkaloid undissolved (by difference). |
|---|---|---|---|---|---|
| Rad. alc.. | 12.1–21.4 | 0.76–3.98 | 5.13–21.27 | Too small for estim. –1.37 | 0.00–2.62 |
| Bellad.... | 21-5–25.1 | 0.94–1.26 | 2.92–4.46 | Too small for estim. | ? ? |
| Fol. alc... | 10.5–17.5 | 0.81–2.90 | 21.9–85.0 | 0.75–1.32 | 0.00–1.58 |

—Pharm. Jour. Trans., Oct. 1891, 364.

*Carbolized Styptic Collodion*—Carbolic acid, 10; tannic acid, 5; benzoic acid, 3; collodion to 100 parts.

*Cocaine Styptic Collodion.*—Cocaine hydrochlorate, 5; tannic acid, 15; absolute alcohol, 30; elastic collodion, 50 parts.

*Diachylon Collodion.*—Lead plaster, 10; alcohol, 10: ether, 20; collodion, 60 parts.

*Iodide of Lead Collodion.*—Iodide of lead, 1; flexible collodion, 7 parts.

*Iodide of Mercury Collodion.*—Mercuric iodide, 60 grains; potassium iodide, 30 grains; alcohol, 4 fl. oz.; ether, 4 fl. oz.; pyroxylin (soluble), 64 grains.

*Iodoform Balsamic Collodion.*—Iodoform, 5; balsam Peru, 5; soap, 5; collodion, 85 parts.

*Iodo-sulphurated Collodion.*—Iodine, 240 grains; sulphur, 60 grains; flexible collodion, 16 fl. oz.

*Mustard Collodion.*—Volatile oil of mustard, 60 minims; collodion, 6 fl. dr.; glacial acetic acid, 20 drops.

*Naphthol Collodion.*—Naphthol, 1; castor oil, 1; collodion, 16 parts.

*Oleate Collodion.*—About 1 part of the respective oleate to 4 or 5 parts of collodion.

*Styptic Collodion.*—Iron chloride (crystals), 10; elastic collodion, 90 parts.

*Sulphur Collodion.*—Sublimed sulphur, 2 oz. av.; flexible collodion, 16 fl. oz.

*Salol Collodion.*—Salol, 10; ether, 10; flexible collodion, 80 parts.—Pharm. Record, 1892, xiii., 27.

*Salicylated Collodion—New Use.*—A. Sidney Rauschenberg induced a physician to apply this collodion in cases of itch, which was done with gratifying results. Salicylic acid, 1 drachm, tincture of cannabis indica, 1 drachm, and flexible collodion sufficient to make 1 ounce. The collodion was applied after an alkaline bath, to remove all grease from the skin. Ten nights' treatment sufficed. Pharm. Record, 1892, xiii., 124.

## CONFECTIONES.

*Confections—Medicated.*—Several useful formulas for medicated confections (*licorice drops; cayenne drops; ginger beer powder; effervescent vanilla powder*), will be found in Pharm. Record, 1892, xiii., 9.

## ELIXIRIA.

*Elixir of Calisaya.*—M. Vernon communicates the two following formulas, one made from the bark suitable for the soda-water counter, and the other made with the alkaloid for counter sale.

| | | |
|---|---|---|
| I. Tincture of cinchona comp. | 4 fl. ozs. | |
| Tincture of cardamom comp. | 6 fl. ozs. | |
| Tincture of gentian comp. | 2 fl. ozs. | |
| Syrup | 16 fl. ozs. | |
| Alcohol | 16 fl. ozs. | |
| Water | 20 fl. ozs. | M. |

| | | |
|---|---|---|
| II. Sulphate of quinine | 20 grains. | |
| Rose water | 48 fl. ozs. | |
| Alcohol | 12 fl. ozs. | |
| Syrup | 16 fl. ozs. | |
| Water | 20 fl. ozs. | |
| Cochineal tincture to color. | | M. |

—Pharm. Record, 1892, xiii., 72.

*Cascara Cordial.*—R. Good communicates the following:

| | |
|---|---|
| Fluid extract of cascara | 4 fl. oz. |
| Syrup of wild cherry | 2 fl. oz. |
| Syrup | 6 fl. oz. |
| Oils of cloves and cassia, each | 6 minims. |
| Oils of lemon and orange, each | 20 minims. |
| Oil of nutmeg | 4 minims. |
| Oil of fennel | 12 minims. |
| Alcohol | 2½ fl. oz. |
| Fuller's earth | ½ ounce. |
| Water | 2 fl. oz. |

Mix and filter, and pour water through the filter to make 1 pint.—Pharm. Record, 1892, xiii., 122.

*Elixir of Iodine, compound.*—W. Pepper recommends the following: Phosphorus, $\frac{1}{100}$ grain; iodine, $\frac{1}{6}$ grain; bromine, $\frac{1}{6}$ grain, dissolved in 1 fluiddrachm of simple elixir.—Am. Journ. Pharm., 1892, 261, from Univers. Med. Mag., 1892, 376. [Title is not appropriate.—REP.]

*Elixir of Licorice (Ph. Germ.).*—H. Unger states that by subjecting the residue on the filter to distillation with steam he collected nearly one-third of the oils of fennel and anise, showing that by the usual method of preparation the finished elixir will contain that much less of the oils. He proposes to dissolve the extract of licorice in distilled water, add the ammonia, and allow the mixture to stand for eight days in a well-stoppered bottle. After filtering, add the alcoholic solution of the two oils.—Pharm. Zeitg., 1891, 377.

*Elixir of Pyrophosphate of Iron with Quinine and Strychnine.*—C. R. Bechman communicates the following method of making this troublesome elixir:

| | |
|---|---|
| Quinine sulphate | 128 grains. |
| Strychnine sulphate | 2 grains. |
| Iron pyrophosphate | 240 grains. |
| Sodium citrate | 60 grains. |
| Alcohol | 2 fl. oz. |
| Water | 1 fl. oz. |
| Glycerin | 3 fl. oz. |
| Elixir simplex, sufficient to make | 16 fl. oz. |

Dissolve the alkaloidal salts in the alcohol, and 5 fl. oz. of the simple elixir on a water-bath. Dissolve the iron pyrophosphate without heat in the water, and add the sodium citrate and the glycerin. Then add this solution to the alkaloidal solution, and shake, adding finally sufficient simple elixir to make a pint.—Pharm. Record, 1892, xiii., 89.

*Elixir of the Phosphates of Iron, Quinine and Strychnine, improved.*—F. Edel modifies the manipulation as follows: Take of—

| | | |
|---|---|---|
| Quinine sulphate | | 128 grains. |
| Iron phosphate, scales | | 256 grains. |
| Strychnine | | 2 grains. |
| Alcohol | | 2 ounces. |
| Water | | 2 ounces. |
| Glycerin | | 2 ounces. |
| Elixir orange | q. s. | 16 ounces. |
| Solution soda | q. s. | |

Dissolve the strychnine in the alcohol, and the quinine in the glycerin by the aid of heat. Then add sufficient elixir of orange to make 14 oz. Dissolve the iron phosphate in 2 oz. of water by heating; mix with the elixir, and neutralize with sufficient of the soda solution. It is permanent. —Am. Drug., 1891, 271, from Pharm. Era.

The "Year-book of Pharm." for 1891, p. 270, gives a somewhat different formula, credited to F. Edel, containing only 1¼ grains of strychnine sulphate, and 1 fl. oz. of water, besides an addition of 2 fl. oz. of syrup.

*Elixir Rhei.*—B. Ph. C.

| | |
|---|---|
| Rhubarb root in No. 12 powder | 5 oz. |
| Fennel fruit, bruised | 2 oz. |
| Glycerin | 3 fl. oz. |
| Refined sugar | 4 oz. |
| Rectified spirit, 1 volume<br>Distilled water, 3 volumes | a sufficient quantity. |

Moisten the rhubarb and fennel with fifteen fluidounces of the menstruum, macerate for 48 hours and express. Break up the marc, add to it sufficient of the same menstruum to furnish, with the previous pressing, fifteen fluidounces of clear product. Express again after 24 hours' maceration. Unite the liquors, allow to stand for two days, and filter into the sugar and glycerin. Dissolve without heat; then, if necessary, add sufficient of the menstruum to make the product measure one pint (imper.). Dose 1 to 3 fluiddrachms.—Pharm. Jour. and Trans., July 25, 1891, 70.

"*Wiesbaden*" *Elixir.*—Under this name Dr. John Aulde highly recommends a liquid preparation of aloes, which is nothing else but our old friend "Swedish Bitters" in a slightly altered shape; the proportion of aloes to the finished elixir is 1 : 32.

| | | | |
|---|---|---|---|
| ℞. | Spanish saffron | | gr. xx. |
| | Socotrine aloes | | ℥ j. |
| | Boletus laricis | | ʒ j. |
| | Powdered myrrh | | ʒ iss. |
| | Powdered rhubarb, | | |
| | Powdered angelica root | āā | ʒ ij. |
| | Zedoary root, | | |
| | Gentian root, | | |
| | Calamus root | āā | ℥ ss. |
| | Brandy | | O ij. |

—Am. Drug., July, 1891, 202, from Med. Rec.

*Elixir of Yerba Santa.*—Theo. H. Strouse furnishes the following combination of aromatics as making an "ideal" elixir of yerba santa.

| | |
|---|---|
| Yerba santa | 3 ozs. |
| Sweet orange peel | 1 oz. |
| Cardamom, Cloves, Cinnamon, | of each 1½ drachms. |
| Anise, Coriander, Caraway, | of each 1 drachm. |
| Red saunders | ½ drachm. |
| Sugar (granulated) | 1½ lbs. |
| Alcohol, Glycerin, | āā 6 f. ozs. |
| Distilled water sufficient for 2½ pints. | |

Reduce the drugs to No. 40 powder. Macerate for 24 hours and percolate with the mixture of alcohol, glycerin and water, until 2½ pints have passed through. Filter this solution and percolate it through the sugar.—Am. Journ. Pharm., 1892, 7.

### EMPLASTRA.

See under *Sapones*.

### EMULSIONES.

*Emulsions.*—For practical remarks concerning emulsions, see *Pancreatic Juice; Influence of Bile.*

*Oily Emulsions.*—P. Aspern recommends the use of potash soap for emulsifying fixed and volatile oils, stating that they keep unaltered for a relatively long time.

For cod-liver oil:

| | |
|---|---|
| Solution of potash soap (1 : 5) | 40 parts. |
| Cod-liver oil | 160 parts. |

Shake well together; flavor to taste.

Castor oil emulsion of the Addendum to the British Pharmacopœia might be made as follows:

| | |
|---|---|
| Potash soap | 2 parts; dissolved in |
| Water | 10 parts; add |
| Castor oil | 40 parts. |

Shake well, and add oil of peppermint sufficient.

Oil of turpentine:

| | |
|---|---|
| Solution of potash soap (1 : 10) | 40 parts. |
| Oil of turpentine | 50 parts. |

Shake well. Can be diluted with water without separating oil.

—Apoth. Zeitg., 1891, 471.

*Estimation of the Oils;* See under *Castor Oil*, and under *Extract of Malt.*

*Emulsio Amygdalarum Composita.—German Unoff. Formulary.*

| | |
|---|---|
| Sweet almonds, well washed | 5 parts. |
| Hyoscyamus seed | 1 part. |
| Dilute bitter-almond water | 50 parts. |
| Sugar in moderately fine powder | 5 parts. |
| Magnesia (calcined) | 1 part. |

From the sweet almond and the hyoscyamus seeds prepare an emulsion with the dilute bitter-almond water in the usual manner. Strain, and to the strained liquid add the sugar and the calcined magnesia.

This preparation should be freshly made when required.

[*Note.*—Dilute bitter-almond water is prepared by diluting 1 part of bitter-almond water (Pharm. Germ., iii.) with 19 parts of water. The official bitter-almond water of the Germ. Pharm. contains 1 per mille of hydrocyanic acid; hence the diluted water contains 1 part of hydrocyanic acid in 20,000 of water.]—Am. Drug., 1891, 297.

*Emulsio Amygdalarum Saccharata.—German Unoff. Formulary.*

| | |
|---|---|
| Sweet almonds | 10 parts. |
| Sugar | 10 parts. |
| Water | a sufficient quantity. |

From the sweet almonds prepare an emulsion in the usual manner, using sufficient water to make the strained product amount to 90 parts. In this dissolve the sugar.—Am. Drug., 1891, 298.

*Emulsion of Cod-liver Oil.*—Oliver Stout suggests the following as a very palatable emulsion: Triturate 1 oz. of glyconin with 2 oz. of cod-liver oil gradually added, until emulsified; dissolve 50 grains of ammoniated glycyrrhizin in water, and add this solution gradually, followed by water, to the emulsion until four fluidounces are obtained. Hypophosphites may be added with the water.—Am. Jour. Pharm., 1892, 133.

*Emulsion of Cod-liver Oil with Irish Moss.*—P. W. Bedford states that Irish moss mucilage is preferred on a large scale, and that the best way to make the emulsion is to emulsionize a small portion of the cod-liver oil with powdered gum arabic in a mortar, as usual, add it to the Irish moss mucilage, and then gradually incorporate the remainder of the oil by means of some mechanical apparatus (rotary churn).—Pharm. Record, 1892, xiii., 158.

ENEMATA.

*Nutrient Enemata.*—Huber recommends that 1 gm. of sodium chloride be added to each egg, which is given as a nutrient enema. In this way, he thinks, about 12 per cent. is absorbed. An enema should contain two or three eggs, and should be given two or three times daily. An hour be-

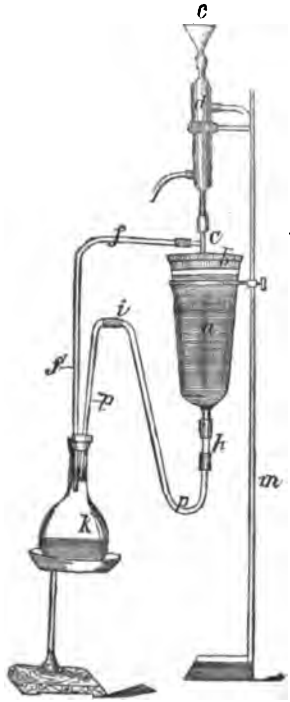
fore it is given the bowels should be washed out with warm water.—Am. Journ. Pharm., 1891, 424, from Corres. Bl. Schweiz. Aerzte.

EXTRACTA.

*Extraction Apparatus—Gomberg's.*—Moses Gomberg has constructed an apparatus suitable for the continuous extraction of large quantities of drugs.

It consists of an ordinary conical glass percolator *a*, of about two litres capacity; the upper opening is fitted with a circular piece of board, *b*, which is about 2.54 cm. thick, and after it has been covered with chamois-skin or other suitable material should fit tightly into the percolator. In the

FIG, 10.




Extraction Apparatus.

centre of the board *b* is a hole to admit a rubber stopper through which one arm of the T-tube *c* is inserted, the upper arm being connected by means of rubber tubing to an upright Liebig's condenser *d*, to the upper end of which is attached, by means of rubber tubing, a small funnel *e* to facilitate the addition of menstruum. The other arm of the T-tube *c* is connected by means of rubber tubing to the hard glass tube *f and f'*, which is about 1 cm. inside diameter, and is so bent that *f* is 25 cm. long and *f'*

45 cm. To the lower opening of the percolator is attached, by means of rubber tubing, a short piece of combustion tubing *h*, which is drawn out to allow a piece of hard-glass tubing *p* and *p'*, 1 cm. internal diameter, to be attached. The tube *p* and *p'*, is bent so as to form a syphon, the upper bend being a little below the level of the powder in the percolator. *p'* from the connection with the combustion tubing *h* to the second turn *i*, is 35 cm.; the remainder *p*, 25 cm., should run parallel with *f'*, and both *p* and *f'* are fitted into a two-holed stopper, which in turn is fitted into a Florentine flask *k* of one liter capacity. The whole apparatus is supported by a high retort stand *m*, the percolator by a large ring, and the condenser by a condenser clamp. The flask *k* is supported by a small retort stand fitted with a suitable ring. The syphon *p* and *p'* may consist of two sections, joined by a piece of rubber tubing at *i*. The use of the apparatus is readily understood from the above.—Harry Kahn in Am. Jour. Pharm., 1891, 474.

*Extracts—Standardization.*—H. Beckurts thinks that until our knowledge of the average percentage of alkaloids is more reliable, it would be best to restrict the pharmacopœial requirements to a minimum percentage which would at all events exclude poor extracts. The need for such requirements is obvious, by comparing the alkaloidal percentage of commercial extracts:

| | |
|---|---|
| Extract of aconite leaves | 1.25 to 4.85. |
| Extract of belladonna leaves | 0.405 to 1.734. |
| Extract of conium leaves | 0.271 to 0.62. |
| Extract of hyoscyamus leaves | 0.37 to 1.40. |
| Extract of nux vomica | 15.47 to 22.02. |

—Apoth. Zeitg., 1891, 538.

M. C. Traub supports the view of Beckurts that the pharmacopœias should require a minimum limit of dry substance and of alkaloids; this would certainly exclude poor extracts. The author found the following percentage of alkaloids in carefully prepared extracts, containing about 20 per cent. of moisture. (These are the extracts of the German Pharmacopœia:) Aconite (leaf) 2.54 to 3.26; belladonna (leaf) 1.92, 2.05, 1.84; conium (leaf) 0.45, 0.46, 0.51; hyoscyamus (leaf) 0.78, 0.82; nux vomica 15.92, 16.43; opium 22.63, 23.10, 22.68 (morphine).—Schweizer. Woch.-Schr., 1892, 22.

*Extracts Containing Chlorophyll—Estimation of Alkaloids.*—Since the presence of chlorophyll renders the estimation difficult, H. Beckurts proceeds as follows: 5 gm. of the extract is dissolved in 50 c.c. of diluted alcohol (0.892), an excess of baryta water added, so as to make 150 c.c., allow to deposit, filter, and precipitate the excess of baryta water by carbonic acid gas. 75 gm. of the filtrate (= 2.5 gm. of the extract) are evaporated to a syrupy consistence, dissolved in a mixture of 6 c.c. of

water, 3 c.c. of alcohol and 1 c.c. of ammonia, shaken out with chloroform, and the chloroformic solution evaporated, and treated as stated under extract of nux vomica, Proceedings 1888, xxxvi, 246.—Apoth. Zeitg., 1891, 538.

*Extracts—Medicinal Variability.*—Patein arrives at the following conclusions: In order to remedy the irregularity of action of the present officinal preparations we must take care: (1) To employ for pharmaceutical uses only those plants which contain a proportion of active principles which has been officially determined. (2) To conserve only those officinal preparations in which the active principles of the plants employed have undergone but slight alterations and which correspond to an official standard. (3) To employ only those active principles of plants, or those chemical products by synthesis, which have a determined elementary composition, and which respond to certain processes of chemical and physiological identification which have been officially formulated.—Am. Journ. Pharm., 1891, 464, from Nouv. Remèdes, July 1891.

*Powdered Extracts.*—M. Conroy, in speaking of extractum euonymi siccum of the Brit. Pharm. Addendum, stated that he had overcome the difficulty of powdering hygroscopic extracts by adding calcined magnesia to the soft extract, and then evaporating to dryness and powdering. Only 10 per cent. of magnesia is necessary.—Pharm. Journ. Trans., Sept. 1891, 189. (Magnesia was recommended by P. W. Squire a couple of years ago in his "Companion.")

*Extracts of Belladonna, Hyoscyamus, Aconite—Assays.*—H. Beckurts still gives the preference to his own method, as detailed in Proceedings 1888, xxxvi., 246; Apoth.-Zeitg., 1891, 537. He claims that all the alkaloid is extracted by the chloroform in the presence of alcohol, and that the emulsionizing is avoided by the presence of the dilute alcohol.

*Extract of Belladonna.*—Compare also Collodium Belladonnæ.

*Extract of Ergot (Ph. Germ.).*—This extract is directed to be made with water, and the liquid to be precipitated with alcohol, filtered and evaporated. M. C. Traub proposes to extract with dilute alcohol, which would do away with the necessity of precipitating with alcohol, and, besides, prevent fermentation, which often occurs in aqueous extractions. The alcohol is recovered by distillation, and the residual liquid is neutralized with calcined magnesia, and then evaporated as usual. Traub considers the neutralization an advantage with a view to the use for hypodermical injections.--Pharm. Zeitg., 1892, 96, from Schweiz. Woch., 1892.

*Ergotin—Uses.*—Dr. Roicki recommends urethral injections of a 1-in-1000 solution of ergotin in chronic gonorrhœa.—Chem. and Drug., July 18, 1891, 78.

*Extract of Licorice.*—Most pharmacopœias require that the insoluble residue, left after complete exhaustion with water, should not exceed a

certain percentage. Südd. Apoth.-Zeitg. (1891, 194) points out that it will be quite as important to state a minimum percentage, in view of the frequent adulteration with water-soluble substances.

*Solution of Licorice—Liquor Extracti Glycyrrhizæ (Nat. Form.).*—F. Edel recommends to follow the National Formulary for making purified extract of licorice, but to evaporate the solution to seven-eighths of the weight of the licorice used, and to add one-eighth the weight of alcohol in which 10 grains of salicylic acid for each pint of finished fluid have been dissolved. He states that it is superior to the fluid extract.—Am. Drug., 1891, 271, from Pharm. Era.

*Extract of Licorice Root.*—M. C. Traub recommends a 30-per cent. alcohol as a better menstruum than either cold or warm water. It requires much less menstruum to exhaust, the liquid is easier to filter, and the extract possesses a sweeter and more agreeable taste, and dissolves easier.—Schweiz. Wochens., 1892.

*Extract of Hyoscyamus—Estimation.*—J. B. Nagelvoort has compared the methods of Beckurts and of Dieterich, and gives the preference to Beckurts' as being not only easier, but also more trustworthy than Dieterich's. He instances an examination of a solid extract according to both methods, that of Beckurts yielded 0.69 per cent., and that of Dieterich only 0.15 per cent. Similarly, another solid extract yielded respectively 0.35 and 0.072 per cent. A fluid extract assayed respectively 0.11 and 0.07 per cent., the differences with one and the same preparation are too great, and the low results by following the method of Dieterich are probably due to the action of the lime in his ether-lime process (see Proceedings 1887, xxxv., 38), which on prolonged contact must destroy part of the alkaloid. Nagelvoort examined four solid extracts and ten fluid extracts from different American laboratories, with the following results: Solid extracts assayed from 0.23 to 0.69 per cent., and the fluid extracts from 0.06 to 0.16 per cent. The difference in strength is probably due to a difference in the crude drug.

*Beckurts' method* is as follows: Dissolve 5 gm. of the solid extract in a sufficient volume of 50 per cent. alcohol, and add sufficient of baryta water to precipitate all the chlorophyll, waxy matter, etc. The mixture is diluted to 100 c.c., and allowed to settle, when it is filtered, and a current of carbonic acid gas is passed through the filtrate. After a proper time withdraw the carbonic acid apparatus, and pass a current of air through the liquid; if this is neglected the next filtrate will become turbid. Filter off 50 c.c., and transfer to a Squibb's separator (Proceedings 1885, xxxiii., 326), add a drop or two of 30-per cent. ammonia, and exhaust with chloroform, rotating the separator gently; prove the exhaustion by evaporating part of the chloroform on a watch-glass, and test the residue, dissolved in acidulated water, with Mayer's reagent. After allowing the chlo-

roformic solution to evaporate spontaneously, dissolve the residue in 5 c.c. of decinormal hydrochloric acid, add 5 drops of tincture of cochineal, and titrate with centinormal soda. Each $\frac{1}{10}$ c.c. of decinormal hydrochloric acid is equivalent to 0.00289 gm. of atropine. For instance: 44 c.c. of centinormal soda were used to titrate back 5 c.c. of decinormal hydrochloric acid. This would make 6 times 0.00289—0.01734. This amount, multiplied by 40 (the starting point was 2.5 gm. of extract), gives 0.6936 per cent. of alkaloid. Nagelvoort would recommend as standards the fluid extract to contain 0.1 per cent., and the solid extract (dry, using sugar of milk as diluent), 0.5 per cent. of alkaloid.—Pharm. Rundschau, N. Y., 1891, 240.

*Extract of Malt—Pharmaceutical Uses.*—Jean Gordon points out that extract of malt serves a good purpose in making mixtures containing insoluble substances in suspension. He instances naphthalin mixtures, five grains of the finely powdered naphthalin being rubbed up with one fluid-drachm of the extract. With tincture of guaiacum a good mixture can be made by stirring together in a graduate equal measures of the extract and afterwards the tincture, gradually added; the tincture must not be allowed to come in direct contact with the sides of the graduate. After standing for a day it separates into two layers, the lower transparent and bright, the upper one having a slightly curdled appearance, but a slight shake of the bottle suffices to cause the layers to mix again. With the resin of guaiacum the method must be slightly different; it should first be rubbed in a mortar with the extract until a smooth paste is obtained, after which sufficient of syrup of wild cherry is added to make the mixture fluid enough. The author mentions gum asafetida and tincture, tincture and fluid-extract of cannabis indica, and copaiva, as suitable substances for exhibition with extract of malt.—Am. Journ. Pharm., July 1891, 341.

*Extract of Malt with Cod-liver Oil—Estimation.*—According to the Committee on Adulteration of the N. Y. State Pharm. Association, the best method for extracting the oil is to mix the extract intimately with a sufficient quantity of well-calcined sea sand to form an easily permeable mass, and exhaust this with chloroform. This is best done by vigorously skaking the mixture four or five times with the chloroform, and allowing it to stand for half an hour each time before separating. After distilling off the chloroform at 104° C., the residue is heated to constant weight, which of course indicates the oil.—D.-A. Apoth. Zeitg., Aug. 1891, 72.

*Extractum Nucis Vomicæ—Standardization.*—According to the British Pharmacopœia, the total alkaloid in one fluidounce of the percolate is first ascertained, and then as much of the percolate as corresponds to 134¼ grains of total alkaloid is evaporated to an exact weight of two ounces (avoir.) This gives an extract containing 15 per cent. of alkaloid, but as a rule it is too thin for convenient use, especially for making pills, not to

mention that it will sooner or later dry up, and then become stronger. The difficulty is, that the yields of alkaloid and extractive matter are not always proportionate. M. Conroy proposes to meet this difficulty by evaporating the percolate to pilular consistence, then testing for alkaloidal strength, and make up to the correct standard by the addition of glucose. J. C. Umney would prefer to extract the marc (of nux vomica) with diluted alcohol, evaporating to stiff extract, and harden the extract with that. W. Martindale considered glucose too soft, and would prefer sugar of milk.—Pharm. Jour. Trans., Sept. 1891, 229. - Drug. Circ., 1891, 247.

*Extractum Nucis Vomicæ—Assay.*—In a review of the different processes H. Beckurts maintains that his process (see Proc. 1888, xxxvi., 246,) is the most reliable; and in view of the variable proportion of strychnine and brucine, he recommends to value the preparation solely according to the percentage of strychnine present.—Apoth. Zeitg., 1891, 532.

*Extractum Opii—Standardization.*—The British Pharmacopœia requires this extract to contain 20 per cent. of morphine, but, owing to the generally high percentage of crude opium, an extract of the officinal strength would in most cases be of a too inconveniently soft consistence. M. Conroy proposes to remedy the softness by evaporating the extract to pilular consistence, estimating its alkaloidal value, and then to bring it up to the officinal strength by the addition of glucose. J. C. Umney would prefer to exhaust the marc with dilute alcohol, evaporate to a stiff extract, and harden the extract with that. W. Martindale thought that sugar of milk would be preferable.—Pharm. Jour. Trans., Sept. 1891, 229.—Drug. Circ., 1891, 247.

See also *Opium* and *Tinctura Opii.*

### EXTRACTA FLUIDA.

*Fluid Extracts—Assay.*—J. U. Lloyd states as a rejoinder to various criticisms that the scheme presented by him (see Proceedings 1891, xxxix, 124–131) was suggested as a generalization, and not as a process perfected and closed as to details. He has since given the following additional details, which, owing to their importance, are given in full:

If a fluid extract is made by means of strong alcohol, the soda magma may not separate clearly when the chloroform is triturated therewith. The difficulty is best overcome by evaporating the alcohol, or by the addition of two (2) c.c. of water, which should be added to the contents of the mortar after the solution of ferric chloride has been mixed with the fluid extract. If the fluid extract is made with diluted alcohol, the chloroform will separate sharply and clear, and the addition of water is unnecessary.

If the fluid extract contain volatile oils, they will in part continue with the alkaloid and reach the final chloroform, unless the ether-modification process suggested for chlorophyll-yielding drugs be adopted. This washing with ether is therefore necessary with drugs in which alkaloids are associated with volatile oils.

If an alkaloid is volatile, it must be fixed in the final chloroform by means of an acid, before the chloroform is evaporated. Then calculate the alkaloid from the resultant salt.

It is necessary that bicarbonate of sodium be added in quantity sufficient to form a *stiff dough magma*. The inexperienced operator is inclined to use it too sparingly, the result being that much of the chloroform is taken into the mass instead of separating therefrom.

Rotate by giving the liquids a circulatory motion. The object, *changing surface contact*, is best accomplished by preserving clear surfaces and rapid rotation. If the liquids be *shaken together*, globules form, enclosing masses of unchanging solution, the result being an emulsion, which should be avoided. By attention to the rotation principle the operator will quickly deplete the liquid, that has least solvent power, of the alkaloid.

The preferable rotator (separating funnel) is the globular, stoppered, and with stopcock. For assay determinations by my process, the eight (8) ounce rotator is best; it should not be smaller. The pear-shaped (Squibb) pattern is better adapted for quiescent separation of different liquids, but is, in my experience, a defective rotator, and I do not use it for rotating. I have taken the liberty to apply the term *rotator* to the globular pattern and *separator* to the pear-shaped pattern, to distinguish them.

A small addition (2 to 5 c.c. to chloroform 100 c.c.) of ammoniated chloroform (96 vols. chloroform and 4 vols. stronger ammonia) in some cases forms a better solvent and will abstract the alkaloid from the soda magma more rapidly than neutral chloroform.

Mix them well together, and after separation draw the chloroform from beneath. If used in large amounts it may produce a jelly with the soda magma.

In some cases the residual alkaloid assumes a yellow color during evaporation of the chloroform. This will be observed with emetine and bases that are affected by heat and ammonia. In some cases traces of accompanying coloring matters intensify the coloration, without, however, appreciably affecting the weight of the crude alkaloid.

Constant weight is quickly attained at a temperature of 100° C., if the alkaloid be in thin layer. It should never, therefore, occupy depth sufficient to permit the formation of a skin over the surface, and for this reason it is best to evaporate the chloroform in shallow, watch-glass-shaped dishes.

Most alkaloids separate amorphous from rapidly evaporated chloroform, and they are often very hygroscopic. In consequence they must be weighed quickly after reaching a constant weight, and even during the act of weighing, unless protected from moist air, will become appreciably heavier. For this reason it is well to clamp a cover-glass over the alkaloid as soon as it is dry.

If the operator prefer, he can evaporate the chloroform after extracting the soda magma, exhaust the residue with the acidulated water, and either

titrate the acid solution, or make it alkaline and abstract the alkaloid with chloroform, and weigh it. I often use this method, and it hastens the process.

Care should be exercized to prevent any of the alkaline water solution from following the final chloroform. It is best to draw these last chloroform fractions into a dry separator, and then separate again, drawing the chloroform into the evaporating dish. If any of the water solution passes into the evaporator it will contaminate the alkaloid with ammonium sulphate. Under these conditions weigh the crude alkaloid, wash the dish well with chloroform, dry it, and weigh it again. The difference will be the amount of alkaloid.

Owing to the insolubility of morphine, the method cannot be employed to the estimation of that alkaloid in opium preparations. Neither will it estimate the total alkaloids of hydrastis.

The fact that a menstruum may be an excellent solvent for an isolated alkaloid does not indicate that it is capable of breaking an alkaloid from its natural combination in a drug. Considerable energy is often necessary in order to liberate alkaloids in condition favorable to their abstraction by neutral solvents—a fact that is shown by the methods adopted in obtaining them on a large scale. For example, chloroform will not abstract all the caffeine from guarana or tea, and neutral solvents such as chloroform and ether will not abstract as completely as might be supposed the alkaloids of other drugs. Preliminary treatment of drugs with acids and alkalies is often necessary to the complete liberation of their alkaloids; and even then non-aqueous liquids are incapable of their perfect abstraction, and an aqueous menstruum is often best or even necessary to search the vegetable integuments thoroughly. It will be seen, therefore, that an assay process that may be applicable to alkaloidal *liquids* is not necessarily useful in assaying the *crude drug*, and a method that may give good results with alkaloidal fluid extracts may be of little value in abstracting the crude drugs from which they are made.

The foregoing remarks will indicate why I may not consider ferric hydroxide as the only active agent of my suggested method of examining alkaloidal liquids. It is, however, a very "potent" factor, and yet the preliminary action of the acid of the ferric chloride and subsequent action of the alkali of the sodium bicarbonate are influences that it seems to me should be considered in connection therewith.

Prof. Prescott writes me concerning my process, and I take the liberty to repeat his words, as they present a valuable suggestion:

"It does not surprise me, ferric hydrate has great powers. It never occurred to me to work with it in alkaloidal separation. Ferric hydrate is a great thing, and, please observe, ferroso-ferric hydrate is still more potent."

I have not employed ferroso-ferric hydrate, and this agent is likely, as indicated by Professor Prescott, to prove superior to ferric hydroxide.

I have, however, met with good results by using a mixture of equal amounts of dry ferric hydroxide and sodium bicarbonate. Rub enough of the mixture into the fluid extract to form a stiff dough, then abstract with chloroform, and complete the assay as suggested previously. It is not improbable that this may serve a better purpose in some, or perhaps most, cases than the method I suggested at the New Orleans meeting.

Another variation, often very quickly performed, and based on the foregoing, is as follows:

*Process of Assay.*—Pour 5 c.c. of the fluid extract into a mortar, and triturate into it enough of a mixture of dry ferric hydrate and sodium bicarbonate to form a thick dough magma. Exhaust this mass by trituration with successive mixtures of chloroform, first using 20 c.c. of the mixture, and 10 c.c. afterward, decanting severally until 50 c.c. of menstruum are obtained. Pour about one-fourth of this chloroform solution into an evaporating basin on a water or steam bath, and as it evaporates add the remainder (the object being to obtain the alkaloidal residue in small compass). Now pour diluted sulphuric acid (1 : 50) into the dish, in amount sufficient to cover the alkaloidal residue, and continue the heat a few moments. Decant the acid solution, filtering it through a small paper. Wash the residue twice more in the same manner with diluted acid, filtering through the same paper (this excludes impurities from the acid liquid). *Titrate this acid liquid, if the operator prefers titration, with either Mayer's solution or use any other alkaloidal reagent.* If not, make it alkaline with ammonia, pour it into an eight-ounce rotator, and abstract the alkaloid with four successive portions of chloroform, 10 c.c. each. Evaporate the chloroform in a shallow dish and weigh the product; the weight multiplied by 40 will show the alkaloidal percentage of the fluid extract.

It will be seen, that if titration be employed, this modification of the scheme *dispenses with the rotator altogether.*

Solid extracts must first be brought to the condition of a syrupy liquid by trituration with solution of ferric chloride (1 gm. of the extract and 2 c.c. of the ferric chloride previously diluted with its bulk of water). After a smooth cream is made, sufficient sodium bicarbonate is added to form a dough, which is then extracted by chloroform in the usual manner. The weight of the final alkaloidal residue must, of course, be multiplied by 100. The operator must use sufficient of sodium bicarbonate to form a tough mass, and thus prevent the formation of an emulsion; the mass should part with most of its chloroform, and not take it into its substance. In order to insure the proper extraction of the alkaloids, it might be well always to triturate with the chloroform in portions of 20, 10, 10, 10 c.c., so as to obtain 50 c.c. of liquid. The smaller the amount of fluid extract (within reasonable limit) the better for accuracy of result.—Am. Drug., 1891, 199, from Proc. Ohio Pharm. Assoc.

J. U. Lloyd has given additional details of the best way in which to conduct the assay. which are given *in extenso :*

*Directions for examining a drug, qualitatively, for alkaloids.*

Percolate the powdered or ground drug with the appropriate menstruum, or, if the proper solvent is unknown, with various menstrua, alcoholic or hydro-alcoholic, and use the percolates in the manner directed for fluid extracts. It will be well to extract the magma produced by the incorporation of the mixture of ferric hydrate and sodium bicarbonate (which will be called, for brevity's sake, "iron magma"), first with chloroform, and then with ether, to evaporate both liquids separately, and to treat each residue as directed for the chloroformic residue.

Prof. Lloyd states that by this method he now finds alkaloids in many drugs which failed to yield them heretofore.

In his former paper he recommended to use the solution of ferric chloride and sodium bicarbonate. He has, however, found since then that dry ferric hydrate will do as well in conjunction with the sodium salt.

*Operation.*—Pour 5 c.c. [or less] of the fluid extract into a flat-bottomed porcelain mortar of about 1 pint capacity, and thicken it to the consistence of a stiff magma by means of a sufficient quantity of a mixture of equal parts of dry ferric hydrate and sodium bicarbonate (which may be called the "iron mixture"). Exhaust this magma by trituration with 20 c.c. of chloroform, decant this, repeat the exhaustion with 3 successive portions, of 10 c.c. each, of chloroform. [In some cases fewer treatments may be sufficient, in others, more chloroform may be preferable. In the case of cinchona more treatments are necessary, as cinchonine is but little soluble in chloroform. Opium and its preparations cannot be assayed by this process at all.]

This treatment frees the alkaloid from its natural combination and causes it to be dissolved by the chloroform, which will also take up fat, resin, and some chlorophyll. On pouring it off, a little of the iron magma may pass along with it. But all impurities are removed in the subsequent treatment.

If the magma should have a tendency to become friable when the first portion of chloroform is added, and if it then takes up the chloroform and does not separate it again (which will happen when the fluid extract is strongly alcoholic), the addition of 2 to 5 c.c. of water after the first trituration will remedy this. It is still better to add a mixture of equal parts of glucose and water, care being taken to use as little as possible. The magma will then separate sharply from the chloroform.

Evaporate the chloroformic solution, preferably in a flat-bottomed evaporating dish (about 3½ inches, lipped), on a water or steam bath.

Then pour on the residue enough dilute sulphuric acid (2 per cent.) to cover the residual film, agitating gently until the residue is permeated, and then carefully decant into the bottom of a small wetted filter, placed in a

small funnel inserted in the orifice of the glass separator (of about 8 ounces capacity).

Repeat the extraction of the residue with 2 per cent. sulphuric acid, and transfer this to the same filter, pouring it against the inside of the top of the filter.

Repeat this again, stirring the residue with a glass rod. [In many cases two treatments are enough.]

[It will always be advisable to wash the filter with a little distilled water.]

Now quickly cool the acid liquid, render it alkaline by ammonia, and extract it by rotating it (not shaking) with three successive portions of 10 c.c. of chloroform. Draw off the chloroform each time on a tared watch-glass placed on a water or steam bath. The watch-glasses should be about 3 inches in diameter, each of them having a second one, well ground, to match.

The residue practically reaches a constant weight as soon as the chloroform has evaporated. Now cool the watch-glass in a desiccator, cover it with its mate, and weigh at once.

The weight of the residue, in grammes multiplied by 20, will give the approximate alkaloidal percentage of the fluid extract.—Ed. Am. Drugg.

Lloyd recommends the use of a mechanical stirrer. He next illustrates his improved manipulation by exemplifying the assay of fluid extract of guarana, which see.—Am. Drug., 1892, 146–151.

In speaking of Lloyd's assay process, the "Bull. of Pharm.," 1891, calls attention to the process of Loesch, which works on similar lines, using, however, alum instead of ferric chloride. The process will be found described in Proceedings 1880, xxviii, 318.

*Fluid Extracts—Value of Lloyd's Method.*—J. Brooks Thornley, in subjecting Lloyd's method to an extensive trial, made first several blank assays, using fluid extract of cascara (which contains no alkaloid, but considerable extractive matter) as a basis, in which were dissolved various quantities of strychnine and atropine; the error, if any, never extended beyond the third decimal place—careful manipulations of course presumed. Atropine 0.34 gm. in 10 c.c. of fl. extr. of cascara yielding 0.0236, and strychnine 0.0172 gm. yielding 0.0174; fl. extr. of cascara itself yielding a residue equal to 0.004 p. c.—Australian J., 1891, 357.

J. U. Lloyd's process for the estimation of alkaloidal galenicals with ferric chloride and sodium bicarbonate, as published in Proceedings 1891, xxxix., 124–131, has been severely criticized by J. B. Nagelvoort, who demonstrates by control experiments according to the methods of Lyons, Flueckiger, Beilstein, Dragendorff, Dieterich, and others, that Lloyd's method does not give as uniform results as the old well-tried ones. He furthermore contradicts the assertion that Lloyd's method will give trust-

worthy results in the hands of the average pharmacist, and proves that the manipulations directed are not conducive to accurate analytical work. He admits that the method in a conveniently short time separates the alkaloids in general from the accompanying coloring matter, etc., and that it therefore is a very good qualitative method. Pharm. Rundschau (New York), 1891, 178–182. This opinion is in accord with Beckurts', who considers it, as at present elaborated, too crude for exact work, but admits that it contains the germ of a reliable and comparatively easy method.—Pharm. Centralhalle, 1891, 649.

——— Thos. H. Norton and H. T. Nichols have subjected Lloyd's process to an exhaustive examination, and especially investigated the following points:

(1) The insolubility, or otherwise, of ammonium sulphate in chloroform.

(2) The complete exhaustion of the magma with chloroform.

(3) The complete exhaustion of the alkaline alkaloidal solution with chloroform by merely "rotating" it.

(4) The increase in weight of some of the alkaloids on the evaporation of their chloroformic solution.

(5) The value of the substitution of the hydrated ferric oxide by the hydrates of alumina or chromium oxide.

(6) The amount of moisture in the pure alkaloids of commerce.

The results arrived at were as follows:

Lloyd's process is well suited to the rapid and approximate assay of alkaloidal fluid-extracts and extracts.

(1) The process is so simple that it can be applied successfully by any skillful pharmacist.

(2) The chloroform employed must be of the greatest purity.

(3) Ammonium sulphate is perfectly insoluble in chloroform.

(4) The exhaustion of the magma with chloroform is for all practical purposes complete, which is proved with solutions of cinchonine, strychnine and brucine.

(5) The exhaustion of the alkaline alkaloidal solutions by "rotating" with chloroform, is also complete. The rotation never requiring to be repeated more than three times (for two minutes each time).

(6) The percentage of alkaloids recovered by this process is somewhat variable:

In five experiments (with each alkaloid) the following percentages were obtained:

| | Lowest. | Highest. | Average. |
|---|---|---|---|
| Atropine | 93.5 | 95.8 | 94.8 |
| Caffeine | 94.4 | 98.4 | 95.9 |
| Quinine | 97.4 | 104.8 | 101.0 |
| Aconitine | 96.4 | 103.8 | 100.2 |
| Cinchonine | 87.2 | 95.5 | 91.9 |
| Cinchonidine | 90.2 | 99.0 | 94.9 |
| Brucine | 104.0 | 115.2 | 109.6 |
| Strychnine | 84.2 | 97.4 | 90.6 |

(7) The influence of chloroform and the subsequent evaporation on the increase or decrease in percentage recovered.

In five experiments (with each alkaloid) the following percentages were obtained:

| | Lowest. | Highest. | Average. |
|---|---|---|---|
| Atropine | 100.2 | 102.2 | 100.6 |
| Caffeine | 99.2 | 100.0 | 99.7 |
| Quinine | 99.8 | 103.4 | 101.2 |
| Aconitine | 104.1 | 106.7 | 105.5 |
| Cinchonine | 99.5 | 100.0 | 99.1 |
| Cinchonidine | 100.0 | 100.4 | 100.2 |
| Brucine | 106.6 | 109.8 | 108.9 |
| Strychnine | 93.5 | 102.7 | 98.2 |

Exactly what causes the increase is a mystery at present.

From a consideration of these two tables it appears that the average loss of alkaloids by this process is as follows:

| | | | |
|---|---|---|---|
| Atropine | 5.8 | per cent. | |
| Caffeine | 4.4 | " | |
| Quinine | 0.2 | " | |
| Aconitine | 5.3 | " | |
| Cinchonine | 7.2 | " | |
| Cinchonidine | 5.3 | " | |
| Brucine | 0.7 | " | (Gain.) |
| Strychnine | 7.6 | " | |

(8) The results are the same whether the hydrates of alumina, chromic oxide, or ferric oxide be used.

(9) The amount of moisture in the pure alkaloids of commerce is exemplified in the following:

| | | |
|---|---|---|
| Atropine | 0.11 | per cent. |
| Caffeine | 0.05 | " |
| Quinine | 2.02 | " |
| Cinchonine | 0.94 | " |
| Cinchonidine | 0.20 | " |
| Brucine | 9.22 | " |
| Strychnine | 1.29 | " |

For further details the reader is referred to the original paper in Pharm. Rundschau, N. Y., 1892, 106.

——— F. A. Thompson has perfected a new method for the assay of fluid extracts, which may also be used for other galenical preparations. His method differs from other methods chiefly in using oak-sawdust for the tannin which it contains, and which serves to retain coloring matter, wax, extractive, and a considerable amount of chlorophyll. (Other kinds of sawdust fail to accomplish this purpose.)

BELLADONNA, STRAMONIUM, CINCHONAS AND HENBANE.

| | Requirement, based on average strength of drug. | | | Amount for assay. |
|---|---|---|---|---|
| Fluid Ext. Belladonna leaves | 0.40 | per cent. | total alkaloids. | 10 c.c. |
| " " Root, U. S. P. | 0.50 | " | " | 10 c.c. |
| " Stramonium Leaves | 0.35 | " | " | 10 c.c. |
| " " Seeds, U. S. P. | 0.35 | " | " | 10 c.c. |
| " Cinchona Calisaya, U. S. P. | 2 | " | quinine. | 2 c.c. |
| " " Red, not less than | 4 | " | total alkaloids. | 2 c.c. |
| " " Pale, " " " | 3 | " | " | 2 c.c. |
| " Henbane, U. S. P. | 0.10 | " | " | 25 c.c. |

*Reagents.*

| | |
|---|---|
| Oak sawdust, No. 20 powder | 5 to 7 gm. |
| Modified Prollius' Mixture* | 100 c.c. |
| Dilute sulphuric acid, 1 to 5 | q. s. |
| Chloroform (1 vol.) and ether (4 vol.), mix | q. s. |
| Ammonia water | q. s. |

*Directions.*—Gradually add the respective fluid extract (cinchona is best diluted 1 in 5 with 50 per cent. alcohol) to 5 or 7 gm. of the sawdust, contained in a shallow dish, and, after thoroughly mixing, expose in a warm (100° to 110° F.) place for half to one hour. Transfer the dry mixture to an elongated 4-ounce bottle, and add 100 c.c. modified Prollius' mixture. After macerating fifteen to twenty minutes, with frequent shaking, transfer 50 c.c. of the clear supernatant liquid to a suitable beaker, add 5 c.c. of water and enough dilute sulphuric acid to render aqueous fluid distinctly acid, after thoroughly mixing with ethereal solution, and evaporate spontaneously or at a low temperature, removing the adhering alcohol by digesting a few minutes on a steam, sand, or water bath. Redissolve all the chlorophyll, wax, etc., in ether, and transfer the two fluids to a 2-ounce prescription bottle having a good lip, rinsing the beaker with sufficient acid water and ether to remove all the contents of the bottle. Wash the acid solution with ether until free from chlorophyll and coloring mat-

| | |
|---|---|
| * Ether | 250 c.c. |
| Chloroform | 90 c.c. |
| Alcohol | 25 c.c. |
| Ammonia, conc. | 10 c.c. |

ter, rejecting the same, then add enough ammonia water to render fluid distinctly alkaline, and extract the alkaloids with the ether-chloroform mixture, using three portions, of 15, 10, and 10 c.c. each respectively. The addition of 5 c.c. of ether here facilitates the complete separation of the ethereal fluid. Evaporate the combined ether-chloroform solution to dryness at a low temperature, or spontaneously in a tared capsule, and dry the alkaloidal residue at 175° to 180° F. to a constant weight. The alkaloids so obtained should be completely soluble in dilute sulphuric acid. In the case of cinchona calisaya, the percentage of quinine can be estimated by the present U. S. P. method, or still better, by De Vrij's precipitation, as an iodo-sulphate.

*Remarks.*—The above process may be carried out satisfactorily by one of the following modifications: 1. Instead of evaporating the ethereal solution, it can be placed in a separator, and the alkaloids extracted out with a small quantity of acid water, using 3, 2, 2, and 2 c.c. respectively, and this solution treated the same as the acid solution in the above process. 2. The alkaloids may be extracted with larger quantities of acid water, using about 20 c.c. in four portions of 5 c.c. each, transferring the same to a separator, adding an alkali, and extracting the alkaloids with chloroform, using three portions of 10 c.c. each, and evaporating the same to dryness, and drying residue to constant weight. By the latter method particles insoluble in acid water are sometimes carried along with the chloroform, unless great care is exercized and time allowed for the chloroform solution to entirely separate. In practice I prefer the original method.

### COLCHICUM SEED AND ROOT.

| | Requirement. | Amount for assay. |
|---|---|---|
| Fl. ext. colchicum seed, U. S. P. | 0.50 Colchicine, by trituration. | 10 c.c. |
| Fl. ext. colchicum root, U. S. P. | 0.50 Colchicine, by trituration. | 10 c.c. |

*Reagents.*

Same as used for above process.

*Directions.*—Proceed the same as with the above process till the alkaloids are obtained in an acid solution, and instead of extracting, dilute the solution to 15 c.c. with 3 per cent. sulphuric acid, and titrate with N-20 Mayer's reagent.

*Rule for Calculating Results.**—Subtract from cubic centimeter N-20 Mayer's reagent used, for each cubic centimeter of fluid after titration, 0.08 c.c., and multiply the remainder by 0.29 for percentage. If less than 3 c.c. N-20 Mayer's reagent is required, dilute only to 10 c.c.

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* Lyons' Manual of Assaying, p. 78.

COCA LEAVES.

| | Requirement. | Amount for Assay. |
|---|---|---|
| Fl. ext. coca leaves, U. S. P. .......... | 0.50 ether sol. alkaloids. | 10 c.c. |

*Reagents.*

| | |
|---|---|
| Oak sawdust, No. 30 powder .......... | 5 to 7 gm. |
| Benzin .......... | 85 c.c. |
| Alcohol (9 vol.) and ammonia (1 vol. con.) mix .......... | 5 c.c. |
| Dilute sulphuric acid, 20 per cent. .......... | q. s. |
| Ether .......... | q. s. |
| Ammonia .......... | q. s. |

*Directions.*—Obtain the dry mixture of sawdust and fluid extract the same as by above process, and, after transferring to suitable bottle, add the benzin and ammoniated alcohol, and macerate for an hour with frequent shaking. Decant 50 c.c. of the supernatant liquid to a suitable separator, add about 2 c.c. of water and sufficient dilute sulphuric acid to render aqueous fluid distinctly acid after a thorough rotation of the two fluids. Draw off the acid fluid, after complete separation, into a 2-ounce bottle having a good lip, repeat washing benzin solution with small portions (2 c.c) of slightly acid water, using not over 10 c.c. in all. Wash the acid fluid with ether till free from chlorophyll and any other coloring matter, render fluid alkaline with ammonia water, and extract alkaloid with ether, evaporating the combined ethereal washings in a tared capsule. Dry alkaloidal residue to a constant weight at 175° to 180° F. Alkaloids should be completely soluble in dilute acid water.

CONIUM SEED.

| | Requirement. | Amount for Assay. |
|---|---|---|
| Fl. ext. conium seed .......... | 0.50 coniine. | 10 c.c. |

*Reagents.*

| | |
|---|---|
| Oak sawdust, No. 30 powder .......... | 5 to 7 gm. |
| Benzin .......... | q. s. |
| Alcohol (9 vol.) and Ammonia (con. 1 vol.) mix .......... | 5 c.c. |
| Dilute hydrochloric acid, 1 per cent. .......... | q. s. |
| Hydrochloric acid, U. S. P. .......... | q. s. |
| Potassium carbonate .......... | q. s. |

*Directions.*—Proceed the same as with coca preparations up to the step of extracting the alkaloids from benzin solution, there substituting hydrochloric for sulphuric acid, using the 1 per cent. acid after the first washings. Wash the acid solution with ether, reject, add about 20 c.c. benzin and sufficient potassium carbonate to precipitate the alkaloids, and shake vigorously. Decant the benzin solution into a 2-ounce vial containing 5 c.c. of 1 per cent. hydrochloric acid. After complete separation return to the original bottle, and repeat the washings two or three times, or until

the alkaloid is completely transferred to the acid solution. Transfer this acid solution—which should be clear, otherwise filter—to a tared capsule by the aid of alcohol, and evaporate at a low temperature, hastening the volatilization of the last traces of uncombined hydrochloric acid by adding at intervals 1 or 2 c.c. of alcohol. Dry at about 90° C. to a constant weight, and weigh as muriate. Multiply the result by 0.77675 to obtain the amount of coniine.

RECAPITULATION OF RESULTS OBTAINED BY LYON'S, LLOYD'S, AND AUTHOR'S PROCESSES.

| Preparation. | Lyon's (Manual of Assaying). | Lloyd's. | Author's. |
|---|---|---|---|
| Fl. ext. belladonna leaves .. | 0.44 per cent. | 0.40 per cent. (re-extracted.) | 0.45 per cent. 0.47 per cent. |
| Fl. ext. belladonna root.... | 0.44 per cent. | 0.39 per cent. (re-extracted.) | 0.46 per cent. |
| Fl. ext. stramonium seed ... | 0.36 per cent. | 0.30 per cent. (re-extracted.) | 0.34 per cent. |
| Fl. ext. stramonium leaves.. | 0.34 per cent. | 0.27 per cent. (re-extracted.) | 0.34 per cent. |
| Fl. ext. cinch. comp......... | 1.47 per cent. (lime process.) | ................ | 1.52 per cent. |
| Fl. ext. conium seed........ | 0.40 per cent. | ................ | 0.38 per cent. |
| Fl. ext. colchicum root..... | 0.36 per cent. | ................ | 0.38 per cent. |
| Fl. ext. coca leaves... .... | 0.53 per cent. | | |
| | 0.50 per cent. | ................ | 0.51 per cent. |
| Fl. ext. Henbane.......... | 0.09 per cent. | ................ | 0.092 per cent. |
| | | | 0.088 per cent. |
| S. ext. stramonium leaves .. | 2.7 per cent. | ................ | 2.9 per cent. |
| S. ext. belladonna leaves... | 4.6 per cent. | ................ | 4.9 per cent. |
| Cocaine (muriate) in 50 per cent. alcohol ........... | Amount taken. | ................ | Found. |
| | (1) 0.50 gm. | ................ | (1) 0.0485 gm. |
| | (2) 0.50 gm. | ................ | (2) 0.0495 gm. |
| | (3) 0.50 gm. | ................ | (3) 0.049 gm. |
| Atropine (sulphate) in 50 per cent. alcohol ........ | Amount taken. | ................ | Found. |
| | (1) 0.0392 gm. | ................ | (1) 0.038 gm. |
| | (2) 0.0191 gm. | ................ | (2) 0.020 gm. |
| | (3) 0.0191 gm. | ................ | (3) 0.0185 gm. |
| | (4) 0.0392 gm. | ................ | (4) 0.038 gm. |
| Hyoscyamine in 50 per cent. alcohol................ | Amount taken. | ................ | Found. |
| | 0.020 gm. | ................ | 0.0185 gm. |

—Am. Drug., 1891, 342, from Proc. Michigan Ph. Association.

*Fluid Extracts—Estimation with Prollius' Liquid.*—Julius Stieglitz objects, with reason, to the old lime-alcohol method as being wasteful of alcohol, requiring much time, and very careful attention to the evaporation of the alcohol, lest the alkaloids should become charred by the sulphuric acid toward the end of the process. He therefore proposes to make use of Prollius' liquid, which is employed to advantage in the assay of crude drugs. For the assay of *fluid extract of cinchona* he proceeds as follows:

To 5 c.c. of the fluid extract are added 95 c.c. of Prollius' liquid (see below), and the two liquids vigorously shaken at frequent intervals for one hour. After allowing to settle completely, 50 c.c. of the ethereal liquid are taken out, and the ether evaporated. The residue is treated as in the lime-alcohol method—dissolved in a small quantity of dilute sulphuric acid, and washed (without any previous filtering) with alcohol-free ether; the ethereal solution is rendered alkaline with soda solution, and the alkaloids extracted by repeated treatment with ether-chloroform (3 ether and 1 chloroform). The alkaloids are dried at 100° C. to constant weight; the quinine may be estimated according to de Vrij, or the method of the British Pharmacopœia. If one wants to work very exact, the fluid extract may be mixed with purified sand or pumice-stone, and dried, before adding Prollius' liquid.

Stieglitz made use of the following different mixtures:

(1) 88 parts of ether, 8 alcohol, and 4 concentrated ammonia.
(2) 80 parts of ether, 17 alcohol, and 3 concentrated ammonia.
(3) 3 parts of ammonia and 97 parts of alcohol.

| | | Prollius. | Lime-alcohol. |
|---|---|---|---|
| Fl. extr. Cinch. Calis | (1) | I. 4.72 p. c. | III. 4.62 p. c. |
| | | II. 4.82 p. c. | IV. 4.74 p. c. |
| Fl. extr. Cinch. succirubræ co. | (1) | V. 2.76 p. c. | VIII. 2.82 p. c. |
| | (2) | VI. 2.77 p. c. | IX. 2.76 p. c. |
| | (3) | VII. 2.80 p. c. | |

Fluid extract of quebracho, estimated in the same way with (1), gave:

| | |
|---|---|
| X. 1.14 p. c. | XII. 1.12 p. c. |
| XI. (dried with sand, see above) 1.18 p. c. | |

*Fluid Extract of Belladonna.*—25 c.c. were dried with sand at a temperature not exceeding 50° C., and treated with (1); as a check another quantity of the same sample was estimated according to F. A. Thompson's modification of Lyon's method (Manual of Assaying, p. 60).

| Prollius. | Lyons-Thompson. |
|---|---|
| XIII. 0.456 p. c. | XV. 0.47 p. c. |
| XIV. 0.48 p. c. | XVI. 0.45 p. c. |

*Solid Extract of Belladonna.*—4 gm., intimately triturated with sand to a crumbling mass, and treated with 100 c.c. of (1) with the following result:

| | |
|---|---|
| XVII. 2.48 p. c. | XVIII. 2.34 p. c. |
| | XIX. 2.32 p. c. |

*Solid Extract of Stramonium Leaf.*—Treated similarly, it yielded:

| | |
|---|---|
| XX. 2.81 p. c. | XXII. 2.70 p. c. |
| XXI. 2.80 p. c. | XXIII. 2.70 p. c. |

These results Stieglitz considers very fair.
—Pharm. Rundschau, N. Y., 1891, 287.

*Fluid Extracts of Belladonna, Hyoscyamus, Stramonium, etc.*—F. B. Raynale thinks the following process is easier and quite as reliable as those hitherto proposed. Two grams of absorbent cotton are packed rather firmly into the bottom of a 4-ounce, round-shouldered, wide-mouthed prescription vial. Then into the center of the cotton by means of a pipette are placed 10 c. c.m. of the fluid extract under examination. The fluid is allowed to remain until it is thoroughly taken up by the cotton, and then there are added to the contents of the vial 100 c. cm. Pollius' fluid modified (ether 250 cc., chloroform 90 c.c., alcohol 25 c.c., concentrated ammonia 10 c.c.) and the whole allowed to remain for about one-half hour. After thoroughly shaking the mixture, 55 c. cm. are poured into a beaker containing 5 c. cm. of water which has been rendered thoroughly acid by a solution of 1 to 5 of sulphuric acid. Carefully mix the acid and the ethereal solutions and allow the latter to evaporate spontaneously or by a gentle heat. Digest on a water bath for a few minutes to expel the last of the chloroform or alcohol. Then to the contents of the beaker add 20 c. cm. stronger ether and carefully rotate with the water, and then pour the whole into a separatory funnel, washing the beaker with sufficient water and ether to remove all adhering particles. Then in the separatory funnel wash the acid water with two more quantities of ether (20 and 10 c. cm. respectively) and separate. Add sufficient ammonia water to render the aqueous liquid alkaline, and shake out with three portions of chloroform of 15, 10 and 10 c. cm. respectively. Evaporate the chloroform solution over a water bath, and dry the residue at 175° to 180° F. to constant weight. —Pharm. Record, 1892, xiii, 122, from Pharm. Era.

*Fluid Extracts—Water Soluble.*—According to M. C. Traub, it would appear that the pharmacists of Switzerland (and probably also of Germany) would much prefer fluid extracts which mix clear with water and syrup. He states that the physicians seldom prescribe fluid extracts as such, but chiefly as convenient preparations for making syrups and infusions of a uniform quality; hence the necessity for a more aqueous menstruum. —Schweiz. Woch., 1892, 30. [The nature and function of fluid extracts are not yet fully understood or appreciated in many countries of Europe. —REP.]

*Cascara Sagrada—Aqueous Liquid Extract.*—J. Moss finds that, although water extracts all the active principles of cascara sagrada, they are not retained when a decoction is evaporated, nor are they taken up and

retained afterwards by the addition of rectified spirit (.838). He finds on the other hand that proof spirit (.920) not only exhausts the bark completely, but throws down no deposit of therapeutic value, and such an extract is therefore more valuable than the officinal (Ph. Br.) aqueous one. —Chem. Drug., Aug. 1891, 297, Drug. Circ., 1891, 246.

In continuation of his researches after a menstruum which would make a preparation which could be freely mixed with water, he found the following satisfactory:

Moisten 1 pound of the bark in No. 20 powder with sufficient water; allow it to remain a few hours to soften and swell; pack loosely, and exhaust with water. Evaporate on a water-bath to the consistency of a brittle extract, which, when cold, treat with cold water until thoroughly disintegrated. Allow to stand and settle; strain through flannel and evaporate to 12 fluid ounces, adding 4 fluid ounces of rectified spirit (0.838) when cold. The specific gravity at 60° F. is 1.050. This fluid extract does not deposit either on keeping or on diluting with water; although bitter, it is devoid of nauseous taste and smell. On analysis the usual deposit was found to consist of (1) a yellow resin insoluble in alcohol (70 per cent.); (2) a crystalline substance soluble in alcohol (70 per cent.), which gave a dark-brown color with potassa and with sulphuric acid (1.843); (3) a large quantity of a red-brown colored body, soluble in alcohol (70 per cent.) from which it could be obtained by evaporation as an easily crumbling cake. This gave a bright-red color with potassa and sulphuric acid (2.83); (4) a substance soluble in alcohol (70 per cent.), water, and in acetic acid. The body (3) was treated with chloroform, which dissolved a yellow crystalline substance, possessing the odor of cascara in a marked degree, and left a dark substance which on boiling with dilute sulphuric acid reduced Fehling's solution. (4) was chiefly glucoside and resin. The activity of the above fluid extract leaves nothing to be desired.—Chem. Drug., Feb. 1892, 262.

George Spencer states that the following process gives as good result as that of J. Moss, and is easier to make. One ounce of ammonium carbonate is dissolved in one gallon (imp. 10 pints) of cold water, and one pound of coarsely powdered cascara bark macerated with it for three days. Transfer to a percolator and exhaust with cold water. Evaporate down to 12 ounces, and when cold add sufficient alcohol to make 16 fluid ounces. Spencer finds that chloroform is superior to any flavoring agent for covering the nauseous taste.—Pharm. Jour. Trans., March 1892, 788.

*Fluid Extract of Cascara Sagrada—Menstruum.*—N. J. Pritzker finds that a menstruum made in the proportion of 25 parts of alcohol to 65 parts of water and 10 parts of ammonia, will give a fluid extract of a dark-red color, which does not precipitate.—Pharm. Record, 1892, 142, from Apothecary, Feb. 1892, 15.

*Extract of Cascara Sagrada.*—G. Hell points out that the disagreeable

alkaline taste of the so-called "tasteless" extract (prepared by extracting the bark mixed with magnesia) can be removed by carefully neutralizing with a very small quantity of potassium bitartrate.—Pharm. Post, 1891, 729.

*Liquid Extract of Cinchona.*—(De Vrij, Supplement Pharm. Neerland.). Macerate 25 parts of powdered cinchona (containing 6 per cent. of total alkaloids) for twelve hours with 3 parts of dilute hydrochloric acid (12.5 p. c. HCl) and 122 parts of water, then add 5 parts of glycerin, and transfer to a percolator, finishing the percolation with water, as long as the percolate is rendered turbid by soda solution. Evaporate the percolate in a vacuum to 25 parts (the weight of the bark).—Pharm. Centralhalle, 1892, 62.

*Fluid Extract of Condurango.*—Vigier macerates 1 part of the powdered bark with 2 parts of alcohol (60 per cent.), transfers the mixture after twelve hours to a percolator, and percolates first with 2 parts of alcohol, and then with 1½ parts of water. The alcohol is distilled off, the residue evaporated to 0.7 parts, 0.2 parts of glycerin and as much alcohol (90 p. c.) added, filtered, and sufficient water added to make one part.—Pharm. Zeits. Russl., 1892, 12, from Zeits. Oester. Apoth. Ver., 1891, 469.

*Fluid Extract of Guarana—Assay.*—J. U. Lloyd gives his latest improvements as follows:

*Iron Mixture.*—An intimate mixture of equal weights of dry ferric hydrate and sodium bicarbonate.

*Glucose Mixture.*—Equal amounts by measure of glucose and water. Assay.—Into an appropriate vessel (Lloyd prefers a flat-bottomed graduate) pour 2.5 c.c. of the fluid extract; to this add 2.5 gm. of the iron mixture. Mix them together with the mechanical stirrer, mentioned on p. 443. Add 10 c.c. of chloroform and mix well again. Should the magma remain flocculent, and the chloroform not separate therefrom, add a sufficient amount (from ten drops to 1 c.c.) of the glucose mixture and incorporate by means of the agitator. Decant the chloroform into a tared beaker glass.

Add 5 c.c. chloroform to the magma, mix again with the agitator, and decant the chloroform into the beaker. Repeat the operation with another portion of 5 c.c. chloroform.

Should the magma collect on the sides of the graduate above the stirrer, scrape it down occasionally by means of the stirrer.

The mixed chloroform solutions are to be evaporated (Lloyd prefers the beaker glass) and the residue weighed.

The weight in grammes multiplied by 40 gives the approximate caffeine percentage of the fluid extract.

2.5 c.c. of fluid extract of guarana should yield not less than 0.1 gm. of a crystalline residue, corresponding to about 4 per cent. of caffeine.

In making a series of comparative tests, the final glasses should be kept together in the desiccator, and the weighings should be made at one time, in order that similar conditions may be maintained. In damp weather care must be observed to weigh quickly, or the operator will be led into error by reason of the hygroscopic nature of the glass and residue. For exact returns platinum evaporators are preferable, as this metal is less hygroscopic than glass, and a better evaporator.

Lloyd next records a series of experiments to ascertain (1) the error from abstraction by chloroform of foreign material from the iron and soda mixture. (2) Errors of the process from variation. (3) Variation in the work of operators under like conditions. (4) Impurity of the caffeine abstracted. (5) Standard of caffeine value for fluid extract of guarana. (6) Caffeine abstracted by the different portions of chloroform. (7) Time consumed in making an assay by this method. The result he sums up as follows:

Ad. 1. No perceptible residue was obtained after the evaporation of the chloroform. Ad. 2 and 3. Even untrained operators may obtain reasonably uniform results, if care is taken to weigh the residues in a perfectly dry condition. Ad. 4. The first crude chloroformic residue, in the case of the caffeine extracted from the fluid extract of guarana, and probably in the case of many other alkaloids extracted from crude drugs or preparations, is not quite pure. Even the second chloroformic residue is apt to retain traces of impurities. Yet these are so small that any attempt to remove them is liable to cause loss of alkaloid. These traces may therefore be neglected, except, perhaps, in some special cases, to be determined by experience. Ad. 5. Fluid extract of guarana of commerce contains, on an average, close to 4 per cent. of caffeine; and a fixed strength might be put at 4 per cent. Ad. 6. In the case of this fluid extract two successive treatments with chloroform will be found sufficient to extract practically the whole of the alkaloid, and if the first portion of chloroform be increased to 15 c.c., the second treatment might be omitted. (Much will depend, of course, on whether approximate results or absolutely correct results are desired). Ad. 7. The process is not only very simple, but also very expeditious. In the usual course of business three assays are sufficient to formulate an average, which will require about forty minutes for the three. If only one assay be desired, the time will be proportionately longer, but need never be more than thirty minutes.—Am. Drug., 1892, 148–151.

*Fluid Extract of Licorice Root.*—Albert G. Reizenstein prepares it as follows: Moisten 16⅔ ozs. in No. 40 powder with 16 fl. ozs. of water, containing ½ fl. oz. of ammonia; pack moderately tight in a cylindrical glass percolator, and exhaust the drug with more of the same menstruum. Heat the percolate, and keep it boiling for about ten minutes, adding some water if it becomes too thick. Set aside to cool, then filter, and wash the

mass on the filter with cold water; evaporate the filtrate to 12 fluid ounces and add 4 fl. ozs. of alcohol. The fluid extract is very sweet, and destitute of the bitter after-taste, usually observed. The most troublesome part is the filtering, the precipitate easily clogging the pores of the filter. —Am. Journ. Pharm., 1892, 133.

*Fluid Extract of Nux-vomica—Commercial.*—Frank J. Peck estimated the fluid extracts gravimetrically by Dunstan and Short's method, and volumetrically by Mayer's reagent, the results varying from 1.06 to 1.90 per cent., the generally adopted strength being 1.57 per cent.—Am. Drug., 1891, 328.

*Fluid Extract of Triticum repens.*—J. W. England has examined six samples of this fluid extract, and found the following variations, which probably are due to the fact that appparently the pharmacopœial time of collection (in the spring) has been disregarded.

| No. | Made. | Sp. gr. | Relative Value in Extractive. |
|---|---|---|---|
| 1 | Fall, 1884. | 1.112 | 96.4 |
| 2 | April, 1890. | 1.154 | 100. |
| 3 | Aug., 1890. | 1.093 | 94.7 |
| 4 | Oct., 1890. | 1.085 | 94. |
| 5 | Sept., 1891. | 1.069 | 92.6 |
| 6 | June, 1891. | 1.148 | 99.4 |

—Am. Jour. Pharm., 1891, 576.

*Fluid Extract of Turkey Corn (Dicentra canadensis).*—Charles E. Hammerquist finds that a menstruum of 4 vols. of alcohol and 1 vol. of water gives a better fluid extract than the menstruum of the National Formulary (3 alcohol and 1 water).—Am. Journ. Pharm., 1892, 133.

## GELATINA.

*Liquids in Capsules.*—C. Carroll Meyer facilitates the dropping of liquids into the capsules by having the lid of a shallow box punched with holes, one inch apart, to hold the capsules. He cautions against getting any of the liquid on the outside, and gives directions how best to close the capsule. The capsule should always be a little larger than actually needed. Volatile oils are best mixed with an equal quantity of any bland fixed oil. —Am. Journ. Pharm., 1892, 17.

*Gelatina Lichenis Islandici Saccharata Sicca.*—(Dry Iceland moss jelly.) German Unoff. Form.

| | |
|---|---|
| Iceland moss, coarsely comminuted | 15 parts. |
| Potassium carbonate | 1 part. |
| Sugar | a sufficient quantity. |
| Water | a sufficient quantity. |

Mix the Iceland moss with enough water to cover it, add the potassium carbonate, and let stand twenty-four hours, occasionally stirring. Separate the liquid, and wash the moss well with water until it no longer has a bitter taste. Now add to it 200 parts of water, digest the whole on a steam bath during four hours, occasionally stirring, and then strain. Repeat this digestion with water, and unite the strained liquids. Then add 5 parts of sugar, evaporate until the mass is no longer sticky, cut it in pieces and dry them. Then reduce them to a moderately fine powder, and mix this with enough sugar to obtain altogether 10 parts of product.—Am. Drug., 1891, 365.

GLYCERITA.

*Glycerinum Belladonnæ.*—B. Ph. C.

| | |
|---|---|
| Extract of belladonna | 1 oz. |
| Boiling distilled water | 1 fl. dram. |
| Rub together in a warm mortar to produce a smooth paste, and add glycerin sufficient to produce | 2 fl. ozs. |

—Pharm. Journ. and Trans., July 25, 1891, 70.

*Glycerite of Salicylate of Sodium—Use.*—A glycerite, made by dissolving 4 to 6 parts of the salt in enough glycerin to make 100 parts, is highly recommended by S. C. Inglessis as an external application in erysipelas, and at the same time the salt is to be given internally.—Am. Drug., Aug. 1891, 240.

*Glycerite of Starch—Rapid Preparation.*—Anselmier heats the glycerin almost to boiling, and pours into it the starch, previously rubbed up with the lukewarm water. Stir until translucent.—Pharm. Post, 1891, 1079, from Apoth. Zeitg.

*Styroglycerite.*—A mixture of 4 parts of tincture of benzoin; 8 parts of glycerin; 1 part of soft soap, and 16 parts of rose water, is highly recommended for chapped hands.—Zeits. Oesterr. Apoth.-Ver., July 1891, 347, from D.-A. Apoth. Ztg.

GOSSYPIA.

*Gossypium Carbolisatum.*—German Unoff. Form.

| | |
|---|---|
| Carbolic acid | 15 parts. |
| Resin | 60 " |
| Alcohol | 520 " |
| Castor oil | 6 " |
| Purified cotton | 200 " |

Dissolve the resin in the alcohol, filter the solution, and add to it the carbolic acid and castor oil. Saturate the cotton with the mixture, press the damp mass until it weighs 600 parts, and dry it without heat.

One hundred parts of the product contain about 5 parts of carbolic acid. —Am. Drug., 1891, 365.

*Gossypium Hæmostaticum.*—German Unoff. Form.

| | |
|---|---|
| Solution of chloride of iron (Ph. Germ., sp. gr. 1.280) | 150 parts. |
| Glycerin | 15 " |
| Water | 250 " |
| Alcohol | 200 " |
| Purified cotton | 200 " |

Mix the liquids, immerse the cotton therein, then press it until the product weighs 600 parts, and dry it at a gentle heat, with exclusion of light.

One hundred parts contain about 25 parts of anhydrous ferric chloride. Keep the product protected against light.—Am. Drug., 1891, 365.

*Gossypium Hydrargyri Bichloridi.*—German Unoff. Form.

| | |
|---|---|
| Mercuric chloride (corrosive sublimate) | 9 parts. |
| Lithium chloride | 9 " |
| Alcohol | 7,500 " |
| Purified cotton | 2,500 " |

Dissolve the salts in the alcohol, which is then preferably tinted with a little fuchsine, and saturate the cotton with the liquid. Then press the cotton until it weighs 7,500 parts, and dry it in an airy place, protected against the light.

One hundred parts contain about 0.25 part of corrosive sublimate. Keep protected against light.—Am. Drug., 1891, 365.

## INHALATIONES.

*Inhalation for Asthma.*—

| | | |
|---|---|---|
| Ether | 1 oz. | |
| Oil of turpentine | 4 drs. | |
| Benzoic acid | 4 drs. | |
| Balsam of tolu | 2 drs. | M. |

—Chem. Drug., Jan. 1892, 136.

*Inhalation for Whooping-cough.*—

| | | |
|---|---|---|
| Thymol | 18 grains. | |
| Carbolic acid | 3½ drs. | |
| Oil of sassafras | 2 drs. | |
| Oil of eucalyptus | 2 drs. | |
| Oil of turpentine | 2 drs. | |
| Oil of tar | 2 drs. | |
| Ether | 1 drs. | |
| Alcohol to make | 3 ozs. | M. |

—Chem. Drug., Jan. 1892, 136.

## INFUSA.

*Infusion-Pot and Strainer.*—J. C. Daniel has brought out a new infusion-

pot, the chief peculiarity of which is a cylinder perforated with holes all over, which serves as container for the material; the whole is then immersed into a pot containing the menstruum (mostly hot water). The idea is certainly not new, but was not hitherto employed in pharmacy.—Chem. Drug., March 1892, 339.

*Infusion of Digitalis—Gelatinization.*—W. Braeutigam has succeeded by a bacteriological investigation in determining that a bacillus is the cause of the change; if a little of the culture be introduced into a sterilized infusion of digitalis, containing about 5 per cent. of simple syrup, gelatinization will take place in about two days; in the absence of the syrup, the infusion became *ropy* but never *gelatinous.* The cultures were made by using an infusion containing 5 per cent. simple syrup, and 6–8 per cent. gelatin as the nourishing medium; the cultures have a grayish appearance with pearly lustre; the bacillus develops in alkaline or acid medium.—Am. Jour. Pharm., Aug. 1891, 406; from Pharm. Ztg., 1891, 349.

Continuing his researches on this subject, W. Braeutigam establishes the following: (1) The gelatinizing is due to a change of cane sugar; it is accompanied by the formation of small quantities of lactic acid and traces of acetic acid; the products of alteration reduce Fehling's solution. (2) The different degrees of gelatinization depend upon the quantity of the sugar and the quality and quantity of the extractive matter acting as nutriment; the extractive matter from roots and stems, owing to their proportion of sugar and salts, being more favorable to the change than the extractive from leaves. (3) The cultures of the Micrococcus gelatinogenus (in the previous article it was stated to be a *bacillus,* but this has been corrected and the micro-organism given the above name), as well as the gelatinized nourishing medium, have been found to exert no deleterious action upon the human or animal system. (4) The gelatinized infusion still preserves its efficacy.—Am. Jour. Pharm., 1891, 458, from Pharm. Centralh., 1891, 427.

*Infusion of Digitalis—Preparation.*—Perron states that the difficulty of obtaining an active infusion of digitalis has been much overrated, and that the age of the leaves is of minor importance, he having made a reliable infusion from sixteen-years-old powdered digitalis. His method, which, by the way, is that followed in German and English pharmacies for many years, is to heat the water to boiling, and then throw in the powdered digitalis (in Germany and England the leaves are merely coarsely cut), and after twenty minutes strain the infusion through fine linen. Chem.-Zeitg., Rep., 1892, 157, from Jour. Pharm. Chim., 1892, xxv., 393.

(The chief thing, after all, is to preserve the digitalis leaves carefully.—Reporter.)

*Infusion of Roses.*—A. G. Hendry, in an article on concentrated infusions, communicates his process for making the infusion of roses, the chief

idea of which is to use water not warmer than 150°–160° F., instead of boiling water, as directed. Neither the albuminous nor pectinous substances of the rose petals will then be extracted, a superior infusion being the result. Owing to the acid, of course, metallic vessels are inadmissible. —Pharm. Journ. Trans., Feb. 1892, 664.

*Injectiones*, see under *Liquores*.

LINIMENTA.

*Linimentum Capsici Compositum* (*Pain Expeller*). Supplement to Pharm. Neerland.)—Macerate for eight days 1 part of capsicum in 3 parts of alcohol (0.834), express, filter, and mix 523 parts of it with 30 parts of camphor, 10 parts each of the oils of rosemary, lavender, thyme, and cloves, 2 parts of oil of cinnamon, 300 parts of ammonia (0.96), and add a solution of 3 parts of soap and 5 parts of caramel in 97 parts of water.—Pharm. Centralh., 1892, 62.

*Linimenta exsiccantia*, or drying liniments, are considered an improvement on the gelatin treatment. The base is made by either triturating in a mortar or heating in a suitable vessel 5 parts of tragacanth, 2 parts of glycerin and 100 parts of water; made by heat, the preparation keeps without the addition of antiseptics. The advantages are that it can be applied in very thin layers, and can be removed by simply washing with water. It is medicated by either dissolving the substance in the water used to make the base, or by triturating with the base.—Ph. A. Pick, Am. Journ. Pharm., Aug. 1891, 405; Ph. Post, 1891, 425; Prag. Med. Woch.

E. Ghillany recommends to make it by stirring the powdered tragacanth in the cold water, allowing to stand for a couple of days until quite homogeneous, then add the glycerin, and heat the mass on a water-bath for about an hour. It must be kept in well-closed vessels and in a cool place.—Zeits. Oesterr. Apoth.-Ver., 1891, 608.

*Polyform* (Edison)—*Composition.*—

| | |
|---|---|
| Morphine sulphate | 6 grains. |
| Chloral hydrate | 1 oz. |
| Camphor | 1 oz. |
| Alcohol | 2 ozs. |
| Chloroform, ether, tincture of aconite, of each | 1 fl. oz. |
| Oil of peppermint | 2 drachms. |

—Pharm. Rundschau, N. Y., 1891, 269.

A slightly different formula is the following:

| | |
|---|---|
| Chloroform | 2 fl. ozs. |
| Ether | 1 fl. oz. |
| Alcohol | 1½ fl. ozs. |
| Chloral hydrate | 2 ozs. |
| Camphor | 1 oz. |
| Morphine sulphate | 6 grains. |
| Oil of peppermint | 1 fl. drachm. M. |

—Pharm. Record, 1892, xiii, 272.

*Actina—Composition.*—The liquid part consists of:

| | | |
|---|---|---|
| Menthol crystals | 1 drachm. | |
| Alcohol | ½ " | |
| Ether | 1 " | |
| Oil of mustard | 2 " | M. |

—Pharm. Record, 1891, xii, 261.

See also under *Olea.*

LIQUORES (SOLUTIONES).

*Waters—Aromatic (and Solutions).*—Barnouvin has investigated the flocculent and other deposits in distilled waters, and found these to belong to algæ, bacteria or fungi. He found further, that in all cases the distilled water used in making the different preparations, already contained the germs of the young organisms, and that the development corresponds with the nature of the salt. He points out what has been recommended so often, that the distilled water should be boiled, and that the containers should frequently be cleaned thoroughly. A little more initial care to exclude micro-organisms will obviate the many slight but annoying changes in aqueous pharmaceutical products.—Am. Journ. Pharm., 1892, 85, from Chem. Drug., 1892, 18.

*Calculation of Percentage Solutions.*—In discussing the question whether the necessary calculation should be made on the basis of "grain to the ounce" or "grain to the fluid ounce," A. G. Vogeler pointedly asks whether we are justified in habitually practicing, for theoretical reasons, that which we are morally certain we are not expected to do, meaning that since physicians always understand percentage solutions to be by measure (*i. e.*, grains to fluid ounce), it would be unwise for pharmacists to make solutions by weight (*i. e.*, grains to the ounce).—Western Druggist, 1892, 124.

——— Joseph W. England, in speaking of percentages, points out that very often distinction is made between percentages by weight and by volume, which by no means are identical; in the former the proportions are all by weight, in the latter the solids by weight and the liquids by volume. He states that the most practical way in which to proceed, is to take the weight of a fluid ounce or a pint of the solvent, as 100 per cent. minus the per cent. (weight of the solid) required, as a basis, and work out the quantity desired, ignoring the increase in volume, which is always a variable factor. For instance, to obtain a pint of a 1:1000 or 1:2000 solution, divide 7,291 by 1000 or 2000 to obtain the number of grains per pint, and add sufficient water to make the product weigh 7,291 grains. If any other liquid than water has to be used, the specific gravity has, of course, to be taken into account by multiplying 455.7 or 7,291 with the specific gravity. —Am. Journ. Pharm., 1892, 72.

——— Hans M. Wilder simplifies the calculation by taking the nearest

convenient round number to the weight of the required quantity, dissolves in it the requisite number of grains of the salt, and, after filtration, measures off the required quantity, throwing away the excess. In order to make a fluid ounce of, say a four per cent. solution of a salt in water, he takes the nearest convenient round number, which is 500 (a fluid ounce of water weighing 456 grains approximately), and dissolves 5 times 4 grains of salt in 500 less 20 grains of water, and after filtration, measures off one fluid ounce. The weight of the menstruum is easily ascertained from its specific gravity.—Western Druggist, 1892, 223.

——— W. A. Puckner has calculated the following two tables, starting from water at 22° C. In using this table, it will usually be found more convenient to weigh the cocaine and add enough water to make the desired volume.

| Per cent. | For 1 fluidounce use | | For 100 c.c. use | |
|---|---|---|---|---|
| | Cocaine hydrochlcrate. | Water. | Cocaine hydrochlorate. | Water. |
| | Grains. | Grains. | Grammes. | Grammes. |
| 1 | 4½ | 451¾ | 0.999 | 98.981 |
| 2 | 9 | 448 | 2.004 | 98.207 |
| 3 | 13¾ | 444½ | 3.013 | 97.432 |
| 4 | 18¼ | 441 | 4.027 | 96.648 |
| 5 | 23 | 437½ | 5.045 | 95.886 |
| 6 | 27¾ | 434 | 6.069 | 95.077 |
| 7 | 32¼ | 430½ | 7.097 | 94.286 |
| 8 | 37 | 426½ | 8.129 | 93.490 |
| 9 | 42 | 423 | 9.167 | 92.692 |
| 10 | 46½ | 419½ | 10.221 | 91.887 |

—Am. Druggist, 1891.

Compare the table of Loudenbeck, given below.

Edo Claassen gives the following rules for calculating the quantity of water (alcohol, etc.) necessary for dilution, and also the quantity of a salt necessary for increasing the strength of a solution. Briefly, the rules are these:

(1) Dilution.

20 parts (a) of a solution of 18 per cent. (b) are to be diluted to 12 per cent. (d); how much more of the diluent (x) is required?

$$\frac{a\,(b-d)}{d}=x \qquad\qquad \frac{20\,(18-12)}{12}=10.$$

(2) Increasing the strength.

20 parts (a) of a solution of 12 per cent. (b) to be brought to 18 per cent. (d); how much more of the respective salt (x) is required?

$$\frac{a\,(b-d)}{d-c}=x \qquad\qquad \frac{20\,(12-18)}{18-100}=1\tfrac{19}{41}.$$

("C" stands here for the percentage of the salt, which of course is always 100).—Pharm. Rundschau, N. Y., 1892, 83.

C. C. Sherrard has given a couple of tables in the "New Idea," 1891, 278, which are based on the erroneous supposition that the addition of 1 part of a salt dissolved in 100 parts of menstruum would make a 1 per cent. solution. The error in weak solutions may, for all practical purposes, be ignored, but with stronger solutions the mistake is glaring: a 25 per cent. solution made according to Sherrard by dissolving 25 parts of a salt in 100 parts of menstruum, would really only be a 20 per cent. solution, and so on.

O. Oldberg gives the following simple formula:

$$\frac{a \times b}{100-b} = c.$$

a represents the number of grains of solvent, b the desired percentage strength of the solution to be made, and c the number of grains of salt required to be added to a. The total number of grains representing the weight of the finished solution is a+c. H. C. Loudenbeck has calculated the exact amount of salt to be used for making solutions of various percentages and tabulated them, giving the amounts for 1, 2, 3, 4, 5, 10, and 16 fluid ounces. As the tables will take up too much room, only the amounts for 1 fluid ounce are given; a simple multiplication with 2, 3, 4, and so on, will give the amount for any number of fluid ounces.

| Using pure water at 22° C. (71.6° F.), 1 fluid ounce weighing 455.19 grains. | For each fluid ounce of water take of the salt— |
|---|---|
| To make: | Grains: |
| 1 per cent. | 4.597 |
| 2 per cent. | 9.289 |
| 3 per cent. | 14.078 |
| 4 per cent. | 18.966 |
| 5 per cent. | 23.957 |
| 10 per cent. | 50.576 |
| 15 per cent. | 80.327 |
| 20 per cent. | 113.797 |
| 25 per cent. | 151.730 |
| 40 per cent. | 303.460 |
| To make: | Grains. |
| 1 in 1000 | 0.456 |
| 1 in 500 | 0.912 |
| 1 in 400 | 1.141 |
| 1 in 300 | 1.522 |
| 1 in 200 | 2.290 |
| 1 in 100 | 4.597 |
| 1 in 50 | 9.289 |
| 1 in 25 | 18.966 |
| 1 in 20 | 50.576 |
| 1 in 5 | 113.797 |

—The Apothecary, Feb. 1892, 10-13.

*Calculations for Definite Specific Gravity.*—Karl Mueller communicates the following rule for calculating the necessary quantities of both concentrated solution and water, for obtaining a definite quantity of a solution of a definite specific gravity. Let "V" designate the volume desired of the dilute solution of the specific gravity "s", and let "S" stand for the specific gravity of the concentrated solution which is to be diluted, then we have: To every $V\frac{s-1}{S-1}$ c.c. of the concentrated solution add $V\frac{S-s}{S-1}$ c.c. of water. In this way the necessity for making a larger quantity of diluted solution than needed, is avoided.—Pharm. Zeitg., 1891, 503.

See also the calculation in detail in Am. Drug., 1891, 346.

——— A. Frankenstein gives the following rules for ascertaining the respective quantities necessary of two liquids of different specific gravity in order to produce a liquid of any intermediate sp. gr.

(1) Where no contraction takes place on mixing: The *volumes* of the two liquids are to each other *inversely* as the respective differences of their *sp. gr.* from that to be produced. Suppose we have two liquids, A.–sp. gr. 1.190 and B.–sp. gr. 0.972, and want a liquid of sp. gr. 1.125; we take 153 volumes of A. (1.125–0.972) and 65 volumes of B. (1.190–1.125).

(2) Where contraction takes place on mixing: It is preferable to go by weight. The *weights* of the two liquids are inversely as the respective differences of their *percentage by weight* from that to be produced. From alcohol of sp. gr. A.–0.820 and B.–0.940 we want an alcohol of sp. gr. 0.900; the respective p. c. by weight are: 91, 39.8 and 58.05. We therefore mix 18.25 parts by weight of A. (58.05–39.8) with 32.95 parts by weight of B. (91–58.05) to obtain an alcohol of 58.05 p. c. by weight (sp. gr. 0.900).—Am. Drug., 1891, 352, from Pharm. Zeitg.

Charles Caspari, Jr., after pointing out that "alligation" cannot be used indiscriminately for the adjustment of specific gravities in liquids, although excellent for determining proportions and percentages both for weight and volume, gives the following formulas:

*Adjustment by Volume.*

(1) To adjust the specific gravity of a known volume of a liquid of known specific gravity.

Let $y$ represent the volume of the liquid to be diluted.
$a$ represent the specific gravity of this liquid.
$b$ represent the specific gravity desired.
$c$ represent the specific gravity of the diluent.
$x$ represent the volume of the diluent.
(Whenever water is the diluent, $c$ is made 1.000.)

$$x=\frac{y(a-b)}{(b-c)}$$

(2) To make a definite volume of a liquid of definite specific gravity by mixing two liquids of known specific gravity, both being of the same kind, or one being water.

Let $mv$ represent the desired volume of the mixture.
$a$ represent the specific gravity of the liquid to be diluted.
$b$ represent the specific gravity desired of the mixture.
$c$ represent the specific gravity of the diluent.
$x$ represent the volume of the diluent.
$y$ represent the volume of the liquid to be diluted.
(Whenever water is the diluent, $c$ is made 1.000.)

$$y=\frac{mv\ (b-c)}{(a-c)}$$

Having thus found the volume of $y$, it is subtracted from the desired volume, and the remainder will be the volume of $x$.

*Adjustment by Weight.*

(1) To adjust the specific gravity of a known weight of a liquid of known specific gravity.

Let $w$ represent the weight of the liquid to be diluted.
$a$ represent the specific gravity of this liquid.
$b$ represent the specific gravity desired.
$c$ represent the specific gravity of the diluent.
$x$ represent the weight of the diluent.
(Whenever water is the diluent, $c$ is made 1.000.)

$$x=\frac{w\times c\ (a-b)}{a\ (b-c)}$$

(2) To make a definite weight of a liquid of definite specific gravity by mixing two liquids of known specific gravity, both being of the same kind, or one being water.

Let $mw$ represent the desired weight of the mixture.
$a$ represent the specific gravity of the liquid to be diluted.
$b$ represent the specific gravity desired of the mixture.
$c$ represent the specific gravity of the diluent.
$x$ represent the weight of the diluent.
$y$ represent the weight of the liquid to be diluted.
(Whenever water is the diluent, $c$ is made 1.000.)

$$y=\frac{mw\times a\ (b-c)}{b\ (a-c)}$$

Having thus found the weight of $y$, it is subtracted from the desired weight, and the remainder is the weight of $x$.—Pharmaceutical Review, 1892, 9–12.

*Hypodermic Injections.*—J. Gordon Sharp recommends to add a certain

proportion of glycerin to the injections, so as to prevent the piston from drying (shrinking).—Pharm. Journ. Trans., April 1892, 848.

*Solution of Albumen, B. P.—Preservation.*—R. A. Cripps finds that the addition of about 10 per cent. of acetic acid, B. P., is sufficient to preserve the solution of albumen for several months.—Year-book Pharm., 1892, 268, from Pharm. Journ. Trans., xxi., 939.

*Fluid for "Weather Glass"—Baroscope.*—Dissolve 2 parts of ammonium chloride and 2 parts of potassium nitrate in 64 parts of hot distilled water, and filter the still warm solution into a filtered solution of 2 parts of camphor in 30 parts by weight of alcohol (0.830–0.834).—Pharm. Rundschau, N. Y., 1891, 295.

*Wither's Antizymotic Solution.*—According to Otto A. Bierbach, this solution contains the following ingredients:

| | | |
|---|---|---|
| Mercuric chloride | 0.207 | parts. |
| Aluminium chloride | 0.084 | " |
| Zinc chloride | 0.048 | " |
| Potassium chloride | 0.087 | " |
| Sodium chloride | 0.788 | " |
| | 1.214 | " |
| Free hydrochloric acid, in 100 parts of the solution | 0.060 | " |

—Am. Drug., 1891, 272, from Pacific Drug Review

*Chlorinated Lime—Solution.*—Boyer and Durand use as indicator for the titration of solutions of chlorinated lime methylene-blue instead of the indigo solution ordinarily employed. Solutions which have been more or less decomposed by sunlight or daylight, can only with difficulty be titrated by means of indigo solution; methylene-blue, on the other hand, is not acted upon by the decomposition products.—Pharm. Centralh., 1892, 251, from Chem. Zeitg., 1892, 354.

*Solution of Chlorinated Soda.*—Herison and Lefort propose to use sodium sulphate instead of the carbonate for decomposing the chlorinated lime. They claim that the solution thus made is neutral instead of being alkaline.—Am. Journ. Pharm., 1892, 313.

For remarks on the practical difference between the formula of U. S. P. 1890, and those of 1870 and 1880, by Dr. E. R. Squibb, see under *Urea*, estimation.

*Solution of the Four Chlorides.*—According to Dr. W. Goodell himself, who originated this formula, it is prepared as follows:

| | |
|---|---|
| Hydrargyri bichloridi | gr.j. |
| Liq. arsen. chlor. | ♏xlviij. |
| Tinc. ferri chloridi, | |
| Acidi hydrochlorici diluti | āā f℥iv. |
| Syrupi zingiberis | q. s. ad. f℥iij. |
| Misce. | |

—Am. Journ. Pharm., 1892, 5.

*Fehling's Solution—Improved.*—Rossel states that the addition of glycerin increases the stability of this solution. He dissolves 34.56 gm. of cupric sulphate in water, adds 150 gm. of pure glycerin (free fron acrolein), 130 gm. of potassa, and sufficient water to make 1000 c.c.; 1 c.c. indicates 5 mgm. of glucose.—Pharm. Post, 1892, 137, from Schweiz. Wochens.

*Liquor Ferri Albuminatis.*—Francis Hemm gives the following formula, which is stated to keep well:

| | |
|---|---|
| Dialyzed iron | 12 fluid drams, |
| Egg albumen | 12 " |
| Cinnamon water | 30 " |
| Alcohol | 30 " |
| Hydrochloric acid | 15 drops, |
| Water, sufficient to make | 18 fluid ounces. |

Mix the white of eggs with cinnamon water, and filter, add to it the dialyzed iron, previously diluted with 6 fluid ounces of water containing the acid, and the two liquids are well shaken together. Finally, add the alcohol, and sufficient water to make 18 fluid ounces. It appears to act more beneficially than the one made by using chloride of iron.—Pharm. Record, 1891, xii., 453.

——— *Estimation of Iron.*—Ten gm. of the liquor are diluted with as much water, and heated on a water-bath. Add 10 c.c. concentrated hydrochloric acid, heat a few minutes longer, filter off the separated albumen, and wash the filter until a drop of the wash-water scarcely reacts with sulphocyanate of potassium. Heat the filtrate, add a few c.c. of decinormal solution of potassium permanganate (to get rid of any traces of albumen), boil with a few drops of alcohol, add potassium iodide, and titrate with thiosulphate solution.—L. van Itallie, Chem. Zeitg. (Rep.), 1891, 207, from Apoth. Zeitg., 1891, 366.

*Liquor Ferri Oxidati Dialysati—German Unoff. Form.*—After dialyzation, the liquid is concentrated at a temperature not exceeding 30° C., until it has the specific gravity of 1.050.

A brownish-red, clear, odorless liquid, of a very faintly acid reaction, and but slightly astringent taste. It contains 3.5 per cent. of metallic iron.

On diluting 1 c.c. of it with 19 c.c. of water, and then adding 1 drop of silver nitrate solution, the liquid must appear clear by transmitted light.

On heating 5 c.c. of it with 5 c.c. of diluted nitric acid until the liquid has become yellow, then adding 4.2 to 4.5 c.c. of decinormal silver nitrate volumetric solution, and filtering, the filtrate should not be rendered turbid by the further addition of silver nitrate.—Am. Drug., 1891, 376.

*Liquor Ferri Peptonati—German Unoff. Form.*—

| | |
|---|---|
| Peptonate of iron prepared from 20 parts of albumen. | |
| Brandy | 200 parts. |
| Water, enough to make | 2,000 " |

Mix the liquid peptonate of iron obtained from 20 parts of dry albumen (by the formula printed on page 365 of Amer. Drug., 1890), after solution has been effected by means of the hydrochloric acid, with the brandy and enough water to make 2,000 parts.—Am. Drug., 1891, 377.

*Liquor Hydrargyri Albuminati—German Unoff. Form.*—

| | |
|---|---|
| Egg albumen, fresh | 15 parts. |
| Bichloride of mercury | 1 " |
| Sodium chloride | 4 " |
| Water | 80 " |

Beat the egg albumen to a foam, allow this to become liquid again by standing, and then add to it a solution of the two salts in the water. Set the liquid aside for two days in a cool and dark place, and filter.

A yellowish, faintly acid liquid, having a saline, afterwards slightly metallic, taste. It is not affected by hydrochloric acid or solution of soda. Hydrogen sulphide solution produces in it a black precipitate.

This preparation must be kept in the dark.—Am. Drug., 1891, 377.

*Liquor Hydrargyri Peptonati—German Unoff. Form.*—

| | |
|---|---|
| Mercury bichloride | 1 part. |
| Pepton, dry | 3 parts, |
| Water, enough to make | 100 " |

Dissolve the mercury salt in 20 parts of water and mix it with a solution of the pepton in 10 parts of water. Collect the precipitate after one hour, gradually add it, under stirring, to a solution of 0.75 parts of sodium chloride in 50 parts of water, and when solution has taken place, add enough water to make 100 parts.

A yellowish liquid having the same properties as the preceding.—Am. Drug., 1891, 377.

*Essence of Pepsin.*—

| | |
|---|---|
| Pepsin in scales | 120 grains. |
| Glycerin | 1 fl. oz. |
| Elixir of taraxacum compound | 1 fl. oz. |
| Alcohol | 2 fl. ozs. |
| Oil of cloves | 1 drop. |
| Syrup | 2 fl. ozs. |
| Dilute hydrochloric acid | 1 fl. dr. |
| Water, to make | 16 fl. ozs. M. |

*Liquid Pepsin.*—

| | |
|---|---|
| Pepsin in scales | 64 grains. |
| Water | 6 fl. ozs. |
| Dilute hydrochloric acid | 1 fl. dr. |
| Glycerin | 1 fl. oz. M. |

—F. J. Wulling, Pharm. Record, 1892, xiii, 43.

*Limonada Purgans cum Magnesio Citrico.* (*Citrate of Magnesia*).—Germ. Unoff. Form.

This formula differs from ours in containing less citric acid, and in using sodium bicarbonate. The relative proportions of acid, magnesium carbonate and sodium bicarbonate are: 32; 20; and 2.5.—Am. Drug., 1891, 376.

*Liquor Magnesii Citratis.*—J. E. Huber proposes to expedite the preparation of an always fresh solution as follows: Into each perfectly dry 8-ounce bottle put 59 grains of calcined magnesia and 250 grains of powdered citric acid, and cork tightly with a good cork. (For a 12-ounce bottle, take: 88 grains and 375 grains respectively). When a bottle of citrate of magnesia is wanted, add 2 ounces of water and shake by a rotatory motion so as to mix the ingredients; then loosen the cork, allowing for the expansion of vapor, cork again, and shake vigorously, when a clear solution results, to which is now added the requisite amount of water, syrup and potassium bicarbonate. In the formula for 8 ounces, 206.5 grains of the acid are acted on by 59 grains of magnesia, leaving 43.5 grains of acid, of which 14 grains combine with the 20 grains of potassium bicarbonate, leaving 29 grains for the acid solution.—Western Druggist, 1891, 330, from Proc. Illinois Ph. Association.

——— Bienert recommends an addition of 5 to 6 per cent. of glycerin, which is stated to insure stability; the solution with the glycerin should be allowed to stand for 24 hours before filtering and adding the alkali.—Schweiz. Woch., 1892, 16, from Pharm. Zeits. Russl.

*Mercuric Chloride Pellets.*—C. J. Bond calls attention to the advantages of a combination of equal parts of mercuric chloride and sodium chloride for the preparation of solutions for surgical and medicinal purposes. A pellet containing 4½ grains of mercuric chloride dissolved in a pint (20 fluid ounces) of warm water (which takes about three minutes) forms a solution of 1 in 2,000 (pretty nearly). The advantages are: (1) That solutions in hard water do not throw down a precipitate, or turn milky, which is often the case with the double salt of mercuric chloride and ammonium chloride. (2) The solution is neutral and not acid, as in the case of the ammonium salt; moreover sodium chloride is a normal constituent of the blood serum and other fluids of the body. The author thinks that for these reasons the officinal (B. P.) solutions of mercuric chloride should be made with the sodium chloride instead of ammonium chloride.—Year Book Pharm., 1891, 268, from Chem. Drug., 1890.

*Liquor Plumbi Subacetatis—With Magnesium Acetate.*—Kubel calls attention to a solution of oxide of lead in magnesium acetate (differing from the officinal solution of subacetate of lead in the use of a solution of magnesium acetate instead of water). Carbonic acid passed into this solution precipitates carbonate of lead as an amorphous powder, of a pure white

color and considerable body; the filtered solution may serve to dissolve more oxide of lead, and so on. This method has been patented. Kubel recommends this "magnesium-lead solution" as much preferable to the officinal, and prepares it as follows:

187 gm. of dilute acetic acid are diluted with a little water, and saturated with magnesium carbonate (free from chlorine), and, finally, sufficient water added to make the whole mixture weigh 1 kilo. After filtering the specific gravity is taken (about 1.0377; the solution will contain about 10 per cent. of magnesium acetate). The solution is digested for one hour on a water-bath with 7 per cent. of lead oxide (or boiled for a shorter period), the evaporated water replaced and filtered after one hour, when the specific gravity is again taken; a difference of 0.001 corresponds to about 1 per cent. of lead oxide.—Archiv. Pharm., 1892, ccxxx., 175-182.

*Liquor Potassii Arsenitis.*—Braeutigam states that the mucus-like masses, floating about in any old sample of the arsenical solution, are not fungi or other organic bodies, but solely inorganic substances, due to the action of the alkali upon the glass of the bottle.—Zeits. Oester. Apoth.-Ver., 1892, 313, from Pharm. Centralh.

——— The editor of Chem. Zeitg. calls to mind a former proposition to preserve the solution by neutralizing the excess of alkali with acetic acid. —Chem. Zeitg. (Rep.), 1892, 174.

——— The addition of the compound spirit of lavender has the drawback that the solution sooner or later gets turbid and brown. Goeldner proposes to replace the aromatic by a coloring matter, 0.005 gm. of phenolphthalein is sufficient for 100 gm., forming a clear, red solution, owing to the carbonate present; the color is permanent, and does not interfere with the titration.—Am. Journ. Pharm., 1892, 232, from Pharm. Zeitg., 1892, 163.

——— T. Shepheard calls attention to the danger arising from prescribing Fowler's solution with strychnine or other alkaloids. The solution being alkaline, the alkaloid will be thrown down, but is dissolved on the addition of a few drops of dilute hydrochloric acid.—Chem. Drug., Aug. 1891, 298.

——— *Use.*—A Berlin specialist has had great success in removing warts by giving Fowler's solution in weekly increasing doses, beginning with 2 drops for adults, and ½ of a drop for children.—Am. Drug., Aug. 1891, 251; Pharm. Centralh, 1891, 480.

*Liquor Strychninæ Hydrochloratis, B. P.*—This preparation (strychnine, 9 grains; dilute hydrochloric acid, 14 minims; rectified spirit, ½ fl. oz.; distilled water, 1½ fl. oz.) has shown itself to be quite unstable, depositing crystals of strychnine hydrochlorate on the least provocation. This tendency has been variously ascribed: to a lower temperature; to the presence of alcohol; to the strength; and to age. W. Duncan has inves-

tigated the matter and finds the cause to be excess of hydrochloric acid, which was shown by adding two drops of the dilute acid to one fluid drachm of a clear solution; crystals appearing within one hour. He found, too, that the addition of alcohol checks the liability of acid solutions to crystallize, when the temperature falls. The remedy is either to use only the theoretical quantity of hydrochloric acid (which would be 10 minims to 9 grains) or to start from the hydrochlorate of strychnine, and, of course, leave out the acid.

C. A. Macpherson proposes the following alteration: Take of strychnine 35 grains or 1 part; dilute hydrochloric acid, 38 minims or 1 fluid part; rectified spirit, 2 fluid ounces or 25 fluid parts; and distilled water to make 8 fluid ounces or 100 fluid parts.—Pharm. Journ. Trans., April 1892, 843.

*Indian Brandy.*—

| | |
|---|---|
| Spiritus ætheris nitrosi | 4 fl. ozs. |
| Tincturæ rhei comp. (Ph. Br.) | 4 fl. ozs. |
| Syrupi | 1 fl. oz. M. |

—Chem. and Drug., April 1892, 571.

*Essence of Coffee—Analysis.*—P. Fyfe analyzed three samples of essence with the following result:

| | 1 | 2 | 3 |
|---|---|---|---|
| Caffeine | 00.22 | 00.18 | 00.15 |
| Cane sugar | 44.00 | 33.85 | 56.95 |
| Fruit sugar, etc. | 19.64 | 29.03 | 11.22 |
| Mineral matter in ash | 1.52 | 1.42 | 1.32 |
| Water | 34.62 | 35.52 | 30.36 |

— Chemist and Druggist, Sept. 1891, 390.

*Essence of Vanilla—Formula.*—The following peculiar formula is given in the Chem. and Drug., July 18, 1891, 96:

| | |
|---|---|
| Vanilla | 1 oz. avoir. |
| Carbonate of potash | 20 grs. |
| Boiling water | 2 oz. |

Cut the vanilla small, dissolve the potash in the water and pour upon the vanilla. Cover and set aside until cold; then transfer to a bottle, and add:

| | |
|---|---|
| Musk | 1 gr. |
| Rectified spirit (.838) | 14 oz. |

Macerate four days, filter, and wash the filter with spirit to 16 oz.

*Concentrated Solution of Myrrh.*—A. Fluegge obtains a concentrated solution of myrrh by macerating one part of powdered myrrh with one or two parts of castor oil and one-fifth part of the weight of the myrrh of alcohol for about one week. The solution is then poured off from the undis-

solved myrrh, and the alcohol dissipated by a gentle heat.—Zeits. Oesterr. Apoth.-Ver. 1892, 296.

MISTURÆ.

*Mixtures Containing Bismuth.*—W. Duncan communicates a peculiar prescription which shows one way in which to make an easily shaken-up bismuth mixture.

| | |
|---|---|
| Liquoris bismuthi, B. P. | 1½ fluid ounces. |
| Acidi nitrici diluti | q. s. |
| Aquæ destillatæ | q. s. ad 4 fluid ounces. Mix. |

The intention of the prescriber was to get freshly precipitated bismuthic oxynitrate. As far as the nature of the precipitate is concerned, the prescriber was in error, as the following equation will show:

$$(NH_4)_2BiC_6H_5O_7+3HNO_3=3NH_4NO_3+BiC_6H_5O_7.$$

The precipitate is not the oxynitrate but the citrate, which appears as a gelatinous white mass, remaining suspended for a long time, and easily shaken up. The quantity of dilute nitric acid to be added to the above mixture to complete precipitation is about 3 fluid drachms.

Neither a mucilage nor any other suspending agent is necessary.—Western Druggist, 1892, 166.

*Basham's Mixture—Improved Formula.*—F. W. Haussmann, in view of the well-known instability of this mixture as made according to the officinal formula, calls attention to a modification given in the National Dispensatory, which is quite stable; it is nearly three times the present strength.

| | |
|---|---|
| Liq. ammon. acetatis | ℥ ivss |
| Ac. acetici diluti | ℨ j |
| Tinct. ferri chloridi | ℨ ss |
| Tinct. aurant. cort | ℥ iss |
| Glycerini | ℥ ss |

The deep-brown, almost black color is due to the use of tincture of orange peel, which therefore should be replaced by elixir of orange U. S. P. The solution of ammonium acetate should be freshly prepared, and not too alkaline; the second pharmacopœial method (solution of the carbonate, etc.) gives better results. In summer an increase of acetic acid becomes necessary —Am. Jour. Pharm., 1891, 533.

*Neutralizing Cordial.*—According to the Eclectic Dispensatory, the formula is:

| | |
|---|---|
| Rhubarb in coarse powder, Potassium carbonate | each two ounces. |
| Golden seal, Cinnamon | each one ounce. |
| Refined sugar | four pounds. |
| Brandy | one gallon. |
| Oil of peppermint | twenty minims. |

Macerate the rhubarb, golden seal and cinnamon in half a gallon of the brandy for six hours with a gentle heat; then transfer the mass to a percolator and displace with the remaining brandy. The remaining strength, if there be any, can be obtained by adding water until the liquid comes off tasteless. To the percolate add the potassium carbonate, sugar and oil of peppermint, the latter having been previously rubbed with sufficient sugar to absorb it, and mix the two percolates.

It is stated that 76 per cent. alcohol may be substituted for the brandy. —Am. Jour. Pharm., 1892, 4.

*"A. C. E." Mixture (Anæsthetic).*—

| | |
|---|---|
| Alcohol | 1 part. |
| Chloroform | 2 parts. |
| Stronger ether | 3 parts. |

All by volume. Mix.

— Pharm. Record, 1892, xiii., 250.

*Soda Mint.*—As it might possibly be of interest, the following differing formulas for this popular remedy are reprinted here:

G. Norris, in Griffith's Formulary:

| | |
|---|---|
| Sodii bicarb. | 4 drachms. |
| Spir. ammon. aromat | 1 drachm. |
| Aq. menth. pip | 16 fluid ounces. |

Ellis' Formulary:

| | |
|---|---|
| Sodii bicarb. | 2 drachms. |
| Spir. ammon. aromat. | 40 drops. |
| Aq. menth. pip | 8 fluid ounces. |

E. Wilson, in Parrish's Pharmacy:

| | |
|---|---|
| Sodii bicarb. | 1½ drachm. |
| Aq. menthæ (vir.?) | 4 fluid ounces. |

— Am. Journ. Pharm., 1892, 189.

*Rossbach's Expectorant Mixture.*—

| | |
|---|---|
| Hydrochlorate of apomorphine | 1 grain. |
| Hydrochlorate of morphine | ½ grain. |
| Diluted hydrochloric acid | 10 drops. |
| Distilled water | 5 fl. oz. |

In tablespoonful doses.

The dilute acid has been added for pharmaceutical reasons, lest the apomorphine be decomposed, which will be indicated by a greenish color. —Am. Drug., Aug. 1891, 251.

*Mistura Solvens—German Unoff. Formulary.*—

| | |
|---|---|
| Ammonium chloride | 5 parts. |
| Purified extract of licorice | 3 parts. |
| Water | 193 parts. Mix. |

— Am. Drug., 1892, 38.

*Bejean's Gout Remedy—Composition.*—This remedy, sometimes named "Schewalla français" consists of: Extract of gentian, 5.0; potassium iodide and sodium salicylate, of each 4.0; water, 80.0; and alcohol, 20.0 (all gm.), and 5 drops of gaultheria oil.—Pharm. Zeitg., 1891, 421.

*Nesbet's Specific.*—

| | |
|---|---|
| Olei santali | 12½ drachms. |
| Olei cassiæ | 1½ " |
| Olei pimentæ | 40 minims. |
| Spir. rectificati | 3½ ozs. |

Dose.—A half to a whole teaspoonful.

—Chem. Drug., Jan. 1892, 93.

*Lac Ferri Pyrophosphorici* (Milk of pyrophosphate of iron).—German Unoff. Form.

| | |
|---|---|
| Sodium pyrophosphate | 2 parts. |
| Glycerin | 5 " |
| Solution of chloride of iron (sp. gr. 1.280) | 3 " |
| Water | a sufficient quantity. |

Dissolve the sodium pyrophosphate in 40 parts of water, add the glycerin, and filter. Then gradually add to it, *gently* stirring, the solution of chloride of iron previously diluted with 40 parts of water, and finally add enough water to make the product weigh 100 parts. A turbid, whitish liquid.—Am. Drug., 1891, 376.

*Linolin.*—P. W. Bedford states that linolin is a linseed-oil mixture, which originated from a suggestion by Dr. W. H. Thompson some twenty years ago. (His formula will be found in Proceedings 1889, xxxvii, 393.) —Pharm. Rec., 1892, xiii, 158.

## MUCILAGINES.

*Mucilage of Acacia—Nearly Colorless.*—According to Zeits. Oesterr. Apoth.-Ver., one part of gum arabic is dissolved in two parts of water, 0.1 part, each, of pure carbonate of calcium and coarsely powdered animal charcoal added, and the whole allowed to stand 24 hours. The solution is then diluted with 10 parts of water, filtered, and finally evaporated to the proper weight (3 parts). The mucilage is now nearly colorless, and keeps well for a long time.—D. A. Apoth. Zeitg., July 1891, 67.

*Mucilage of Dextrin.*—H. D. Sykes recommends the following substitute for gum arabic mucilage as being much cheaper.

| | |
|---|---|
| White dextrin | 6 oz. av. |
| Dilute acetic acid | 1 fl. oz. |
| Oil of cloves | 10 drops. |
| Glycerin | 1 fl. oz. |
| Water, sufficient to make | 16 fl. oz. |

Mix the dextrin thoroughly with 6 fl. oz. of cold water, add 8 fl. oz. of

boiling water, boil for five minutes, stirring constantly. When cool, add the remainder. One drachm of salicylic acid may be used instead of the acetic acid —Pharm. Record, 1892, xiii., 5.

*Mucilage of Irish Moss.*—J. Besele makes an excellent mucilage from rish moss by boiling it with p otassium carbonate, straining and evaporating to a proper consistence, and adding sufficient of sodium silicate, rock candy and glycerin.—Zeits. Oesterr. Apoth.-Ver., 1892, from Chem. Zeitg.

### OLEATES.

*Oleate of Copper.*—B. W. Peschke finds that, prepared by double decomposition between sodium oleate and a copper salt, this oleate would always contain free oleic acid, and he therefore proposes the following formula: A convenient quantity of oleic acid is heated on a water-bath to about 50° C., an excess of freshly precipitated moist carbonate of copper added, and, after the first evolution of carbonic acid gas has ceased, the temperature of the water-bath is raised to the boiling point, and kept there to complete the reaction. The resulting mass is dried and treated with cold benzin, and the filtrate leaves, after the evaporation of the benzin, a dark-green mass, becoming hard and brittle on cooling. The melting point Peschke gives as 167° C.—Pharm. Era, 1892, 301.

*Hydrargyrum Oleinicum.—German Unoff. Form.*

| | |
|---|---|
| Yellow oxide of mercury | 25 parts. |
| Alcohol | 25 " |
| Oleic acid | 75 " |

Triturate the yellow oxide of mercury, in a porcelain capsule, with the alcohol, add the oleic acid, and continue triturating until the mixture has become so thick that it remains nearly homogeneous. Allow it to stand twenty-four hours, then warm the capsule and contents at a temperature not exceeding 60° C., and stir until the product weighs 100 parts.

A faintly yellowish-white, somewhat translucent mass of the consistence of a stiff ointment, having a distinct odor of oleic acid, slightly soluble in alcohol or ether, more readily in benzin, and completely in fixed oils.—Am. Drug., 1891, 365.

*Oleate of Mercury.*—F. Edel states that this preparation is much more permanent if made by precipitating the solution of nitrate of mercury with a solution of oleate of potassium.—Am. Drug., 1891, 271, from Pharm. Era.

——— H. Wyatt, Jr., states that by triturating the mercuric oxide with a little liquid paraffin to form a smooth cream, and then adding it to the oleic acid, the time will be shortened considerably.—Pharm. Journ. Trans., Dec. 1891, 524.

### OLEORESINÆ.

*Oleoresins—Substitute for Ether.*—George M. Beringer, after reviewing

the literature of this subject, and from his own experiments, comes to the conclusion that it will perhaps be found advisable to adopt different menstrua for the different drugs. Ether, excellent as it is, has the two drawbacks: expensiveness and easy inflammability. Benzin, which was the first menstruum proposed, does not fully exhaust the drugs, with the single exception, perhaps, of capsicum. It occurred to Beringer to use acetone; he found, however, that the acetone procured from distillers of wood products, although guaranteed to be 85 per cent., consisted largely of methyl alcohol, and even higher boiling fractions; purification by fractional distillation proved unsatisfactory. Subsequently he obtained some acetone from the manufacturers of chloroform by roasting acetate of calcium or barium, which left nothing to be desired.

*Acetone* from this source is a colorless liquid, having a not unpleasant odor, and a specific gravity of 0.800 to 0.802 at 15° C. It leaves no residue on evaporation, and distils over almost entirely between 55° and 60° C., being nearly absolutely pure acetone. It is miscible with alcohol, ether and water, and can be easily distilled on a water-bath, boiling evenly and without that bumping that is usually so noticeable in wood products. Its present cost is about 20 to 30 cts. a pound less than stronger ether, and the loss in handling and distilling is considerably less. It possesses remarkable solvent power (for many alkaloids and neutral principles as well as for oils and resins), and Beringer predicts its extended applicability in the pharmaceutical and chemical laboratory. As with ether, the first percolate with acetone contains nearly all the medicinal ingredients of the drug, so that it is unnecessary to continue percolation after 2 c.c. of percolate are obtained for each gm. of the drug employed; the increased yield obtained by continuing percolation until exhaustion does not compensate for the loss of menstruum incurred. In every instance the powders were dried after extraction with acetone, and repercolated with stronger ether, but nothing of value was yielded to that solvent. The resulting oleoresins were generally of excellent quality, and the yield and characters were nearly the same as those obtained by the use of ether. The acetone recovered by distillation is contaminated somewhat by the odor of the drug. and considerably weakened by the absorption of moisture from the drug. It should be fractionated over fresh lime for subsequent operations.

*Oleoresin of Aspidium.*—Beringer removed the brown chaff and stipes entirely from imported rhizomes of Filix mas, and used only selected pieces, which will probably account for the large yield obtained. It yielded 18 per cent., against 16.18 per cent. by the officinal process; the increased yield is accounted for by the pectin and red-brown coloring matter, which soon deposits. It yields a clear solution with ether, alcohol, chloroform and glacial acetic acid. In the final evaporation on the water-bath, care must be had not to heat the oleoresin too high, or too long, else gelatinization is apt to result (70 to 80° C. is about high enough).

*Oleoresin of Capsicum.*—As generally stated in text-books, the yield is 4 to 5 per cent. This will presume that the fatty matter extracted is separated, which probably rarely is the case; we see therefore manufacturers obtain as high as 20 to 22 per cent. Ether extracted 17.32 per cent., acetone 18 per cent., and purified benzin 21 per cent. By thoroughly exhausting with acetone and benzin the yield was in both cases 25 per cent., but the oleoresin was almost solid. The solidity being largely due to palmitin, and palmitin being but slightly soluble in alcohol, suggested the use of alcohol. The yield was 28 per cent. The liquid portion of this extract was dissolved in an equal volume of ether, and filtered through absorbent cotton. This yielded about 14 per cent. of an exceedingly hot oleoresin. (Maisch states that the amount of fat depends upon the presence of the seeds, the albumen of which contains notable quantities of fatty matter.)

*Oleoresin of Cubebs.*—The yield with acetone agrees quite closely with that obtained by using ether—from 21 to 25 per cent. It is readily soluble in ether, chloroform, alcohol and glacial acetic acid.

*Oleoresin of Lupulin.*—The yield is the usual one—about 60 per cent., depending upon the purity of the lupulin used.

*Oleoresin of Black Pepper.*—Acetone extracted 9.97 per cent., which after straining off the separated piperin, amounted to 5.93 per cent. of an oleoresin soluble in alcohol, ether, chloroform and glacial acetic acid. The yield with ether is but little larger, about 5 to 6.7 per cent.

*Oleoresin of Ginger.*—The yield with acetone was 5.57 per cent., unsurpassed in aroma by that made with ether.

*Oleoresin of Parsley Seeds (Apiol).*—Acetone extracted 24 per cent., from which 3 per cent. of wax separated, leaving 21 per cent. of a bright-green liquid oleoresin, soluble in ether and chloroform. Benzin extracted 22.3 per cent., which was soluble in acetone, ether and chloroform. An examination of the commercial apiols showed that none of them complied with the requirements of that proposed by Joret and Homolle, nor with that made according to the process of L. Wolff.—Am. Jour. Pharm., 1892, 145–150.

*Extract (Oleoresin) of Aspidium.*—According to Poulson and Quirll, it is not advisable to give the extract of male fern together with castor oil or other fixed oil, because the anthelmintic principle is soluble in fats, and therefore in such combination might easily be absorbed. Filicic acid anhydride is considered poisonous. Crequy administers the extract with calomel (10 parts of the former to one part of the latter).—Zeits. Oester. Apoth.-Ver., 1892, 201.

——— Yield, see under *Aspidium Filix Mas.*

*Oleoresina Zingiberis—Menstruum.*—S. J. Riegel, desirous of ascertaining whether another solvent than ether would give a satisfactory

oleoresin, treated unbleached Jamaica ginger and East India ginger with alcohol, benzin and ether. Alcohol yielded a product closely resembling the officinal oleoresin; it was perfectly soluble in ether and chloroform, but only partially in benzin, which latter removed the pungency and odor. Benzin extracted only half of the oleoresin, the remainder being taken up by ether. The yield was remarkably uniform; 5 per cent. from Jamaica ginger and 8 per cent. from East India ginger. It would then appear that alcohol might be substituted for ether.—Am. Journ. Pharm., 1891, 531.

## OLEA.

*Oleum Carbolisatum—German Unoff. Formulary.*—Dissolve 2 parts of carbolic acid in 98 parts of olive oil by a gentle heat.—Am. Drug., 1892, 38.

*Oleum Chloroformi—German Unoff. Formulary.*—Mix 1 part of chloroform with 2 parts of olive oil.—Am. Drug., 1892, 38.

*Castor Oil—Tasteless.*—It is recommended to give castor oil in beer. —Pharm. Post, 1892, 582. (That means: floating on the foam.)

*Castor Oil—Sweetened.*—Sweetened castor oil is prepared by thoroughly washing the oil with hot water, and incorporating sufficient saccharin to impart a sweet taste; it is then flavored by adding small quantities of oil of cinnamon and extract of vanilla. Standke.—Am. Jour. Pharm., 1892, 143, from Rundschau, Prag, 1892, 111.

*Castor Oil with Malt.*—S. M. Burroughs recommends to make castor oil palatable by mixing it with extract of malt, which is easily done in a mortar.—Chem. Drug., August 1891, 297.

*Cod-liver Oil with Arsenic.*—0.50 gm. of arsenious acid are dissolved in 20 gm. of absolute alcohol by means of a fragment of potassium carbonate. The solution is filtered, added to 1500 gm. of the oil, and heated on a water-bath until the alcohol is dispelled. 30 gm. contain exactly 5 mgm. of arsenious acid, and it may be administered to children in ½ or 1 teaspoonful doses.—Zeits. Oesterr. Apoth.-Ver., 1891, 728, from Pharm. Zeitg.

——— F. X. Moerk points out that if the arsenious oxide be entirely dissolved, 30 gm. will contain 10 mgm. and not 5.—Am. Journ. Pharm., 1892, 83.

*Oleum Morrhuæ Ferratum—German Unoff. Form.*—Triturate 1 part of benzoate of iron with 100 parts of cod-liver oil, and warm gently until dissolved.—Am. Drug., 1892, 38.

*Ferrated Cod-liver Oil.*—Neuss communicates the following formula as one very easily prepared:

| | |
|---|---|
| Cod-liver oil | 2000.0 |
| Alcohol | 1500.0 |
| Solution of potassa (G.P. ii.) | 3300.0 |

Stir together in a capacious iron or enameled capsule, heating gently, until saponification has been effected. Then, while yet warm, stir into this saponaceous mass a mixture of

| | |
|---|---|
| Solution of ferric chloride (G. P. ii.) | 2700.0 |
| Water | 5000.0 |

The ferric oleate separates as a soft brown mass from which, on cooling, the supernatant liquor is poured off, the iron soap being washed repeatedly with clean water. After thorough draining remove the last traces of moisture by evaporation. Now add to the mass contained in the capsule five times its weight of cod-liver oil, apply heat until the iron soap is completely dissolved, and finish the preparation by adding enough more cod-liver oil to bring the whole to the weight of 27,000 grams. Set aside for one week and filter.

The foregoing preparation contains approximately one per cent. of iron, which can readily be brought to the customary standard of one-half per cent.—Western Drug., 1891, 296, from Pharm. Zeitg.

———F. Weber dissolves 3 parts of anhydrous ferric chloride ($FeCl_3$) in 997 parts of cod-liver oil by triturating in a mortar. Filter, if necessary. The oil will contain about 1 per cent. of iron.—Zeits. Oester. Apoth.-Ver., 1892, 202.

*Cod-liver Oil—Ferro-Iodated.*—F. Weber triturates 2 parts of powdered iron and 4 parts of iodine with 40 parts of cod-liver oil, adding a little ether until all the iodine has disappeared, and a black mixture is obtained. Add sufficient of cod-liver oil to make 1000 parts, and filter. The color is reddish-brown, and it contains 5 per cent. of ferrous iodide.—Zeits. Oester. Apoth.-Ver., 1892, 202.

——— Siboni makes it as follows: 41 parts of iodine and 20 parts of iron filings are heated gently with 250 parts of ether, and after the reaction is finished 9000 parts of cod-liver oil are added. The oil is filtered, heated to drive off the ether, and sufficient cod-liver oil added to make it weigh 10,000 parts.—Schweiz. Woch., 1892, 37, from Bollet. farm.

*Oleum Jecoris (Morrhuæ) Iodatum—Form. German Pharm. Soc.*—One part of iodine is triturated with 1000 parts of cod-liver oil, and allowed to stand until dissolved.—Pharm. Post, 1891, 841.

——— F. Weber dissolves one part of iodine in 2 parts of chloroform, and mixes with sufficient cod-liver oil to make 1000 parts. Shaken with starch paste, the latter is not blued.—Zeits. Oester. Apoth.-Ver., 1892, 202.

*Creasotized Oil—Massive Injections.*—Dr. Burlureaux makes hypodermic injections with the aid of compressed air "of 50 to 100, and even 200 gm. of creasotized oil (1 : 14) equal to 3 to 14 gm. of creasote. It is evident that such a massive dose of creasote thrown into the blood must sin-

gularly inconvenience the bacilli." (And how about the patient?, The author, in addition, nourishes the patients with injections of a pure oil (as much as 320 gm.)—Am. Journ. Pharm., 1891, 464, from L'Union Ph., July 1891.

*Concentrated Oil of Hyoscyamus (infused)*.—Xanthopoulos makes this oil in the following way, which may also be employed for other concentrated fatty infusions of leaves and herbs (oils and fats).

100 parts of coarsely powdered hyoscyamus leaves are moistened with 50 parts of alcohol, transferred to a percolator, and sufficient of a mixture of 80 parts of olive oil and 200 parts of ether poured over the leaves to completely cover them. After one week the percolation is proceeded with, and the leaves exhausted with the remainder of the oil-ether mixture, and the last parts of the mixture displaced with a little ether. The ether is recovered at as low a temperature as possible, the residue filtered, and sufficient olive oil added to make up to 100 parts. This oil may be diluted to a convenient strength; 1 part to 9 parts of olive oil being about proper. —Zeits. Oester. Apoth.-Ver., 1892, 222, from. Rev. Pharm. Med.

*Oil of Mullein.*—G. M. Beringer has examined a preparation of that name which is sold at a very high price, and fouud that it is no oil, properly speaking, but apparently an alcoholic tincture from the flowers, and he reflects rather severely on the homeopathic firm which introduces it. The firm in question gives the history of the "oil," and states its mode of preparation, which is the one well-known to our forefathers: to expose the fresh flowers in a well-stoppered bottle to the action of the sun. By this kind of dry distillation, a dark-colored aromatic liquid is obtained, to which 15 per cent. of alcohol is added for preservation. That kind of distillation products were in olden time called "oils."—Am. Journ. Pharm., 1891, 578; 1892, 3.

## FILULÆ.

*Pills with Wax.*—The use of a small quantity of wax for pills containing volatile oils, copaiva, creasote, etc., is all but universal with European pharmacists, especially German ones. P. Carles, however, warns against its use for this purpose, stating that such pills are likely to pass the body in an unaltered state, or to remain for a long time in the intestines. Wax contains very little that is soluble in the gastric juice or the intestinal fluids, and then its melting point (about 63° C.) is too high, the bodily heat being only 37° C.—Pharm. Post, 1892, 579, from Bull. Pharm. Bord., 1892.

*Pills of Chlorinated Lime.*—Durieu makes them with the addition of marshmallow root and vaseline.—Pharm. Zeitg., 1892, 127, from Journ. Pharm. Chim., 1891, 280.

*Creasote in Pills.*—V. Tobisch mixes one part of creasote with two parts of powdered licorice root, and after a couple of minutes finishes the

mass with a few drops of water (about 3 drops to 15 grains of creasote are sufficient).—Zeits. Oester. Apoth.-Ver., 1891, 407.

——— Joseph C. Roberts finds fault with Tobisch's addition of licorice root, stating that the mass is very friable, and not sufficiently plastic. He improves upon that suggestion by adding soap—two parts of creasote, three parts of powdered licorice root, and, after absorption, one part of powdered soap, using sufficient syrup.—Am. Journ. Pharm., 1892, 6.

*Creasote Pills—German Unoff. Form.*—

| | |
|---|---|
| Creasote | 10 parts. |
| Glycerin | 2 " |
| Powdered licorice extract | 10 " |
| Powdered licorice root | 18 " |

Mix, and divide to suit.

—Pharm. Post, 1891, 841.

*Blaud's Pills.*—Ferdinand Lascar criticizes the different methods proposed for making these pills properly (the aim being to keep the iron in the ferrous state), and comes to the conclusion that the compressed pills, made from the finely triturated and dry salts, keep best.—Drug. Circ., 1892, 27.

*Iron Pills.*—H. Wyatt objects to the usual coatings with talc, gelatin, varnish, sugar, etc., on the score of moisture, heat, and thickness of coating. What is required is a protective coating, which shall have no action on the ingredients of the pill or on the digestive economy; it shall allow the pill to disintegrate rapidly in the stomach; it shall not materially increase the size of the pill; and, finally, shall be easily applied and capable of a high finish. The author prefers a thin film of graphite (black lead), which has been recommended, now and then, for years back. The pills are rolled in the graphite, and then finished by rotating with some pressure on a hard polished surface.—Chem. Drug., Nov. 1891, 610.

*Pilulæ Ferri Iodidi.*—Siboni prepares them as follows: A filtered solution of ferrous iodide (made from 41 parts of iodine, 20 parts of iron filings, and 100 parts of water) is mixed with 100 parts of a solution of glucose (42° B. about sp. gr. 1.400), evaporated to 150 parts, mixed with sufficient sugar of milk, and made into 1000 pills or any other quantity). These pills give a colorless solution in water.—Schweiz. Woch., 1892, 37, from Bollet. Farm.

——— *Extempore.*—P. W. Bedford communicates the following modification which dispenses with the evaporation, and thus makes it possible to make the pills fresh.

| | |
|---|---|
| Iodine | 80 grains. |
| Reduced iron | 40 grains. |
| Water | 25 minims, or sufficient. |
| Honey | 30 grains. |
| Marshmallow in fine powder | 120 grains. |

Rub the iodine to a fine powder in a mortar, adding the water, then the honey, and afterward the reduced iron in portions, triturating until the reaction is finished. Add the marshmallow, and having formed a pill mass; divide into 96 pills. Coat with tolu.—Pharm. Record, 1892, xiii., 230.

*Niemeyer's Pills.*—There are three different pills going under that name, all originated, however, by Niemeyer.

*For Dropsical Affections.*—Each pill contains 1 grain each of powdered digitalis, powdered squill and blue mass.

*For Phthisis.*—Each contains ⅙ grain of powdered opium, 1 grain of powdered digitalis, and 1 grain of sulphate of quinine.

*For Anæmia.*—Each contains 2 grains each of potassium carbonate and exsiccated sulphate of iron.—Am. Journ. Pharm., 1892, 171.

*Quinine Pills.*—N. Fassati proceeds as follows: Ten gm. of quinine sulphate, 5 gm. of acacia, 5 gm. of sugar, 3 gm. of tartaric acid and 2 gm. of tragacanth are made into a pill mass with 3 drops of sulphuric acid (conc.?) and 27 drops of water, from which are formed 200 pills. The pills are first rolled in starch and then in talcum, which will give them a handsome coating.—Schweiz. Wochens. Pharm., 1891, 302.

*Pills of Nitrate of Silver.*—Pills and other solid preparations containing silver nitrate, may be handled without staining the fingers, by coating the latter with a thin film of vaselin.—Pharm. Era, 1892, 14.

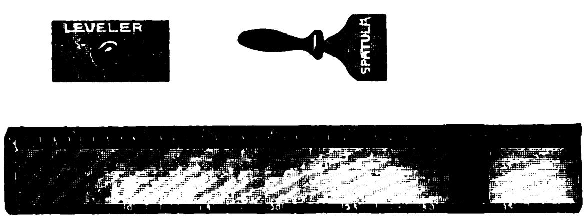
*Terpinol Pills.*—Terpinol 10 parts are well mixed with glycerin 1 part, and then made into a pill mass with powdered extract of licorice 10 parts, and powdered licorice root 10 parts.—Pharm. Post, 1892, 338.

*Unguentum Hydrargyri—In Pills.*—E. Ghillany states, that a suitable pill mass can be obtained by the addition of milk sugar, about twice as much as of the ointment.—Zeits. Oesterr. Apoth.-Ver., 1891, 582.

## PULVERES.

*Powder Divider.*—The latest addition to powder dividers is one made by Fox, Fultz and Webster, and appears to be one of the simplest and

FIG. 11.




**Diamond Powder Divider—Powder Leveler—Powder Spatula.**

handiest devised. The trough is 9 inches long, 1 inch wide, and ⅜ inch deep, closed at one end. This, together with the leveller and spatula, is

made of brass nickel-plated, the latter having ebonized wood handles. The powder is placed in a graduated trough, and the rubber plug placed opposite the graduation denoting the number of powders the prescription is to be divided into. The powder is then leveled in the trough by use of the leveler, after which the plug is removed through the open end of the trough by use of the spatula in connection with the graduation marks.—Pharm. Record, 1891, xii., 460.

*Fumigating Powder.*—Originally made from finely cut aromatic and brilliantly colored flowers, barks and woods, the preparation has of late years been much simplified and rendered less expensive by using variously-colored sawdust, perfumed to suit.

Take not too coarse sawdust (that from conifers is apt to give a terebinthinate odor on burning) preferably in minute squares, from which the fine powder has been sifted off, and variously stained with aniline colors: 4 parts of red, 1½ of blue, ½ of yellow, 1½ of green, ½ of purple, and ½ of orange, with a little diamond dust and imitation gold and silver foil; mix this intimately with the following: 5 parts of finely-cut orris root is soaked in a mixture of 30 parts of tincture of benzoin, 15 of tincture of styrax, 3 of tincture of musk, 5 of Peru balsam, 3 of oil of lavender, 20 of oil of bergamot, 8 of oil of cloves, and 3 of oil of cinnamon.—Pharm. Post, 1891, 1106, from Drog.-Zeitg.

*Powders with Sulphate of Magnesium.*—It is well to recollect that sulphate of magnesium has no inconsiderable quantity of water of crystallization, which in combination with certain salts may form more or less deliquescent mixtures. In such cases it is best to replace it with the proportionate amount of dried sulphate, and make up the weight with sugar, which generally is prescribed.—Chem. and Drug., July 25, 1891, 165.

*Dusting Powder for Infants.*—Garmo recommends a mixture of burnt alum, 15 parts; boric acid, 15; precipitated chalk, 150; starch, 250, and carbolic acid, 3; perfume to suit.—Schweiz. Woch., 1892, 15.

*Iron Carbonate, Saccharated—Preparation.*—Siboni makes use of the preservative influence of glucose. 200 parts of a 5 per cent. solution of glucose are heated to boiling, allowed to cool to 60° or 50° C., and 20 parts of sodium bicarbonate added; filter. 24 parts of ferrous sulphate are dissolved in sufficient water, and poured into the alkaline solution. The precipitate is washed with a warm solution of glucose until the wash-water ceases to act upon barium chloride. The precipitate is then mixed with sufficient sugar of milk to bring it to the desired strength. Sugar of milk is preferable to cane sugar because it dries quicker; the saccharated iron carbonate is finally dried.—Schweiz. Woch., 1892, 36, from Bollet. Farm.

*Powder for Migraine.*—Caffeine citrate, 0.10; phenacetin, 0.12; milk sugar, 0.25 gm.—Am. Journ. Pharm., July 1891, 376, from La Méd. moderne.

*Pulvis contra Pediculos—(Powder against Lice).—German Unoff. Formulary.*

| | |
|---|---|
| Stavesacre seed | 2 parts. |
| Cevadilla seed | 2 parts. |
| White hellebore | 1 part. |
| Tobacco leaf | 3 parts. |

Reduce them to a coarse powder, and mix well.

—Am. Drug., 1892, 60.

*Ferrated Soda Powder.*—Menzer's formula is: Each blue paper contains 3 grains of ferrous sulphate with 7 grains of sugar, and each white paper 3 grains of sodium bicarbonate with 7 grains of sugar. For use, dissolve each powder separately in half a tumbler of cold water, pour together, and drink.—Zeits. Oester. Apoth.-Ver., 1891, 422.

*Pistoia Powder.*—A "protective" against the gout.

| | | |
|---|---|---|
| Bryonia root, | | |
| Gentian, | | |
| Chamomile | ana | gm. x. |
| Colchicum root | | gm. xx. |
| Betony | | gm. j. |

This is made into 365 powders, one to be taken each day.

—Am. Drug., Aug., 1891, 253.

*Sternutament of Roennefahrt.*—This snuff is stated to be finely powdered naphtholcarbonic acid.—Pharm. Post, 1892, 96.

*Sachet Powders.*—Collections of formulas will be found in Pharm. Record, 1892, xiii, 109, and in Pharm. Era, 1892, 170.

*Tooth Powders.*—P. W. Bedford has given several formulas for tooth-powders which contain nothing new except the directions for coloring them, which are here appended:

*Red.* 2 parts of carmine, 5 parts of ammonia and 5 parts of alcohol may be poured on 100 parts of precipitated chalk; or better, add it to 30 parts of water, and then pour upon the chalk, and afterward evaporate at a gentle heat. *Pink.* Use the same quantity of coloring on 200 parts of chalk. *Brown.* 25 parts of tincture of catechu, 5 parts of ammonia to 100 parts of chalk. *Green.* 2 parts of liquid chlorophyll to 100 parts of chalk. *Violet.* A sufficiency of aniline violet to give the desired tint.—Pharm. Record, 1892, xiii., 227.

———A decoction of Brazil wood (from 100–150 parts), to which has been added 15–20 parts of alum. The lake formed is sufficient to color 1000 parts of powder, or more, according to the shade desired.—Am. Journ. Pharm., 1892, 22, from Rundschau, Prag, 1891, 969.

See also "Dentifrices," under *Miscellaneous*.

RESINÆ.

*Resin of Jalap.*—H. Beckurts and W. Brueche consider the determination of the spec. grav., the solubility in alcohol, and the acid, ester and saponification numbers sufficient tests for purity. They found the spec. grav. from 1.143 to 1.151; solubility in alcohol-free chloroform from 3.5 to 6.3 per cent.; the color of the insoluble portion dissolved in solution of sodium carbonate colorless to faintly yellowish; acid number from 11 to 27; ester number from 109 to 126; saponification number from 125 to 140.—Archiv Pharm., 1892, ccxxx., 89.

*Jalapin.*—J. C. Umney calls attention to the difference between the English and the German "jalapin." British makers do not recognize as jalapin the ether-soluble resin so named by Mayer, but apply the term to a product consisting almost entirely of the "convolvulin" of that chemist, viz.: a resin insoluble in ether. German manufacturers send out as jalapin the resin so called by Mayer, and which is soluble in ether, and which constitutes about 90 per cent. of the resin that exists in scammony root, and in Tampico jalap, while the ether-insoluble resin can be obtained in quantity only from true jalap.—Pharm. Journ. Trans., April, 1892, 888.

——— Flueckiger gives the following information: The resin of Ipomæa Purga is but sparingly soluble in chloroform, volatile oils, and ether. The resin of Ipomæa Orizabenzis is largely soluble in these liquids; it is much less active as a medicine. When the resin of I. Purga began to be somewhat more exactly investigated by Buchner and Herberger, in 1831, they called it *jalapin*. Kayser, in 1844, found it to be soluble in sulphuric acid, affording a red solution, and therefore he called the resin *rhodeoretin*. The resin of I. Orizabenzis, which had become known in Europe in the meantime, was thoroughly examined, in 1855, by W. Mayer, who described it as *jalapin;* whereas he applied a new name, *convolvulin*, to the resin of I. Purga. This fully explains the confusion of names. Flueckiger has long ago attempted to introduce the name *orizabin* for Mayer's jalapin, which would be in accordance with jalapin, both names referring to well-known places in the native country of the two plants. Flueckiger would prefer that the name jalapin be replaced by *jalapurgin*, as proposed by J. M. Maisch (Am. Journ. Pharm., 1887, 326. We should then have *jalapurgin*, partially insoluble in ether, meaning the true officinal article, and *orizabin*, soluble in ether, cheaper and less active.—Pharm. Journ. Trans., June 1892, 1060.

——— E. M. Holmes admits the necessity of distinguishing between the two kinds of jalapin, but does not think that the jalapurgin of Flueckiger is likely to come into use, because it does not admit of an intelligible abbreviation. As to "orizabin" he contends that this term is not strictly accurate, since the ether-soluble jalapin is usually obtained from "Tampico" jalap (Ipomæa simulans). He would propose: "Scammonin," at all events until it be proved that the resins of scammony, Tampico jalap and Orizaba jalap are different substances.—Pharm. Journ. Trans., June 1892, 1079.

## SAPONES.

*Soap—Estimation of Combined Alkali.*—According to J. A. Wilson, a weighed quantity of soap is decomposed on a water-bath with dilute sulphuric acid, cooled on ice, filtered, and the fatty acids washed three successive times with 250 c.c. of boiling water, cooling and filtering each time.

In order to estimate the proportion of the alkali of the soap in combination with the soluble fatty acids, the united filtrates are made up to 1 litre, and 500 c.c. of this solution titrated with decinormal alkali, using methyl-orange as indicator in the first instance, and finishing off with phenolphthalein. The latter numbers, calculated to caprylic acid, are those required. The insoluble fatty acids are dried, weighed, dissolved in alcohol, and the alkali originally combined with them estimated by titrating with seminormal alkali.

Or, the acid, equivalent to the total alkali, is obtained by decomposing the soap with normal sulphuric acid, titrating the excess with methyl-orange, and deducting it from the total acid employed.—Am. Drug., 1892, 139, from Chem. News.

*Soap—Estimation of Fatty Acids.*—M. Saupe improves upon the process of Liebermann and Wolff as follows: 2 gm. of finely cut soap are dissolved in a separating cylinder in 50 c.c. of water; 5 c.c. of hydrochloric acid are then added, and the free fatty acids extracted with 54 c.c. of ether, saturated with water. After separation, 20 c.c. of the ether are evaporated in a beaker, and the residual fatty acids weighed.—Year-Book Pharm., 1891, 139; from Pharm. Centralh., xxxi., 314.

*Soap—Estimation of Cane Sugar.*—J. A. Wilson estimates sugar (which is frequently added to toilet soaps to the extent of 20 to 30 p. c.) by means of the polarimeter in the following manner: 10 gms. of the soap are dissolved in a beaker in 150 c.c. of water at 80° C., and a saturated solution of magnesium sulphate added drop by drop from a pipette, stirring well until in slight excess. The whole is thrown on a capacious filter, and the magnesia soap washed three to four times with hot water containing a little magnesium sulphate. The filtrate and washings, which are slightly alkaline, are treated with very dilute nitric acid, until the alkalinity is very faint. Evaporate to 40 c.c., cool, add dilute nitric acid until just acid, then a few drops of basic lead acetate and 2 c.c. of alumina cream; dilute exactly to 50 c.c., and polarize the solution in a 200 mm. tube. The number of angular degrees divided by 2.66 (if the rotation is for the D line) gives the gms. of sugar in the 10 gms. of soap taken. This method is quite satisfactory for all practical purposes. The optical activity of cane sugar has been taken as working simply in a watery solution, but the presence of salts and glycerin does not influence the rotation to any appreciable extent, as shown by comparison with the inversion process hitherto employed.—Chem. News, 1891, lxiv, 28.

*Soaps—Cold Process—Medicated.*—The soap body is first prepared by the subjoined formula, and then the required therapeutic ingredients incorporated, when the soap is poured into the moulds.

*The Soap Body.*—

| | |
|---|---|
| Cocoanut oil | 10 kgs. |
| Tallow | 2 " |
| Soda lye, 38°–40° B | 6 " |

*Antiseptin Soap.*—

| | |
|---|---|
| Antiseptic acid | 1 kg. |
| Water | enough to dissolve. |
| Peppermint oil | 80 g. |

*Camphor Soap.*—

| | |
|---|---|
| Camphor | 800 g. |
| Liquefied fat | enough to dissolve. |

*Camphor-Sulphur Soap.*—

| | |
|---|---|
| Sulphurated potassa | 1 kg. |
| Water | ½ " |
| Camphor | 160 g. |
| Liquefied fat | enough to dissolve camphor. |

*Carbolic Soap.*—

| | |
|---|---|
| Pure carbolic acid | 500 g. |

Prepare the above body soap by stirring the liquefied fat into the lye at 45° C. When combination has set in, incorporate the carbolic acid and quickly pour into the moulds, covering the latter well.

*Iodine Soap.*—

| | |
|---|---|
| Potassium iodide | 1½ kg. |
| Sodium hyposulphite | ¼ " |
| Hot water | enough to dissolve. |

*Naphthol Soap.*—

| | |
|---|---|
| Naphthol | 3½ kg. |
| Citronella oil | 15 g. |
| Thyme oil | 15 " |
| Lavender oil | 15 " |

*Salicylic Soap.*—

| | |
|---|---|
| Salicylic acid | 120 g. |
| Water [alcohol ?] | enough to dissolve. |
| Cassia oil | 33 g. |
| Caraway oil | 22 " |
| Lavender oil | 22 " |

*Sulphur Soap.*—

| | |
|---|---|
| Sublimed sulphur or sulphurated potassa | 1 kg. |

*Tannin Soap.*—

| | |
|---|---|
| Tannin | ½ kg. |
| Hot water | ½ l. |
| Peruvian balsam | 70 g. |
| Cassia oil | 20 " |
| Clove oil | 20 " |

*Ichthyol Soap* is prepared from:

| | |
|---|---|
| Cocoanut oil | 5 kgs. |
| Tallow | 5 " |
| Olive oil | 2 " |
| Soda lye, 38° B | 4 " |
| Potassa lye, 38° B | 2 " |
| Sodium sulphichthyolate | 2 " |

*Tar Soap* is prepared from:

| | |
|---|---|
| Cocoanut oil (temperature 32° C.) | 12 kgs. |
| Soda lye, 38° to 40° B. | 6½ " |
| Wood-tar (or juniper-tar, 1 kg.) | 2 " |
| Cocoanut oil, warm | enough to dissolve the tar. |

*Tar-Sulphur Soap* is prepared by adding 1½ kg. sulphur balsam to the foregoing preparation when finished.

*Thymol Soap* is prepared from:

| | |
|---|---|
| Cocoanut oil | 10 kgs. |
| Tallow | 10 " |
| Soda lye, 37° B | 10 " |
| Thymol | ¾ " |
| Alcohol | enough to dissolve the thymol. |
| Eucalyptus oil | 125 g. |

—Western Druggist, 1892, 136, from Seifenfabrikant.

*Green Soap—Improved Manipulation.*—F. Edel, in making green soap according to the National Formulary, mixes the potash, oil and water in a suitable vessel, and heats continuously, adding alcohol in small portions until the saponification is complete; water to be added from time to time to make up for evaporation. The alcohol hastens the saponification.—Am. Drug., 1891, 271, from Pharm. Era.

*Soap for Celluloid Collars, Cuffs, etc.*—Two parts of soap are intimately mixed with one part of finely powdered pumice-stone, and scented to suit.—Pharm. Centralhalle, 1891, 556, from Erfind. Erfahr.

*Corrosive Sublimate Soap*—(Supplement to Pharm. Neerland.)—Heat 69 parts of over-fat soap (potassa-soda soap) on a water-bath, mix with a solution of 1 part of mercuric chloride in 4 parts of alcohol (0.834), and heat on a water-bath until reduced to 100 parts by weight.—Pharm. Centralh. 1892, 62.

*Sapo Unguinosus* (Mollin).—*Form. German Pharm. Soc.*—Fifty parts

of solution of potassa (15 p. c.) are evaporated to 40 parts, and stirred for half an hour with 40 parts of lard; then 4 parts of alcohol (0.830) are added, the mixture kept for 12 hours at 50°–60° C., and finally 15 parts of glycerin added. (This formula differs from the original one of Kirsten, see Proceedings 1887, xxxv, 67).—Pharm. Post, 1891, 841.

*Zinc Soap Preparation.*– C. Micko tried to produce a zinc soap possessing the consistence of the officinal lead soap (lead plaster), but found that zinc soap, obtained in whatever manner, appeared as a more or less easily friable mass. A good plaster consistence was obtained by melting together 4 parts of dammar, 16 parts of lanolin and 80 parts of zinc soap; the question would be, however, whether these additions would impair the usefulness of the zinc soap. As to the preparation of the zinc soap, Micko found that the direct saponification of the fats with oxide of zinc was a very slow process: heating the free fatty acids with the oxide would be undeniably the best and shortest method, provided the fatty acids could be obtained by a simple process. Commercial oleic acid is not suitable because of its impurities; the purified stearin of commerce (a mixture of stearic and palmitic acids) gives a zinc soap which is easily reduced to a fine, slippery powder, similar to talcum, and which seems well-adapted for dusting powder and toilet powder. He finds that for the pharmaceutical laboratory the best method is to precipitate alkaline soap with zinc sulphate. The soap is dissolved in sufficient boiling water, and the gluey mass decomposed by boiling it with a hot solution of zinc sulphate, which must not be too dilute; the formed, grayish-white soap is washed two or three times with hot water. In order to obtain the soap free from water, it must be well pressed, and heated for a while. It is somewhat soluble in hot ether and alcohol, and contains 12.38 per cent. of zinc, calculated as oxide.—Zeits. Oesterr. Apoth.-Ver., 1892, 309.

*Fluid Soaps.*—F. Buzzi and Keysser propose to make a neutral fluid soap, not from the fat itself, but from the separated fatty acids. They state that in making potash soap from fat directly, an excess of alkali is necessary, which excess cannot be removed by dialysis nor by salting. They first make an olive soda soap, which is decomposed by diluted sulphuric acid. The fatty acids separated are washed with distilled water until the wash-water runs off perfectly neutral, when the acids are saponified by potassa. It will be advisable to test the soap for neutrality, and add small quantities of fatty acids or potassa, as required. Finally, glycerin is added to prevent the soap from thickening too much. A fluid soap, prepared in this way, has a specific gravity of 1.05, and is a transparent liquid of the color of honey; it is, of course, soluble in water and alcohol. Suitably evaporated, it forms *soft neutral soap* of the consistence of ointment.

*Alkaline Fluid Soap* is made by the addition of about 4 per cent. of potassium carbonate.

*Alkaline Soft Soap* is prepared similarly from the soft neutral soap, and is greatly to be preferred to the pharmacopœial (green) soap.

*Over-fat Fluid Soap.*—Buzzi considers it an improvement to replace the free fat of Unna's over-fat or surfatted soap with lanolin. To the fluid neutral soap add 3 to 4 per cent. lanolin. *Over-fat Soft Soap* is made similarly from the soft soap with 10 per cent. of lanolin.

These soaps can be medicated as required. Buzzi and Keysser give formulas for 43 medicated soaps, which are merely enumerated here: Anthrarobin, aristol, belladonna (extract), camphor, carbolic acid, chrysarobin, cod-liver oil, creasote, creolin, ergot (extract), eucalyptol, hydroxylamin, hyoscyamus (extract), iodoform, iodol, iodide of sulphur, lysol, marble, menthol, mercury, naphthol, Peru balsam, potassium iodide, pyrogallic acid, quinine (pure alkaloid), resorcin, rhubarb (extract), salicylic acid, slipyrin, salol, sulphur, silver (oxide and cyanide), sozoiodol, storax, corrosive sublimate, tannin, tar, turpentine, thiol, thymol, white precipitate.

Benzoin cannot be used in soap. Soaps containing quinine salts, iodine, and chloral hydrate do not keep. Soap with sulphurated potassa gives off too abundantly sulphuretted hydrogen, and liquefies too easily. Oxide of silver: Precipitate it by dilute solution of soda from solution of nitrate of silver, wash, and dissolve in a small quantity of ammonia. The best strength is 0.2 per cent. cyanide of silver: Add gradually sufficient of a 10 per cent. solution of potassium cyanide to a 10 per cent. solution of silver nitrate, and neutralize the solution.—Pharm. Post, 1891, 1074, from Dermatol. Studien.

## SALES.

*Ferri Citras Effervescens—German Unoff. Formulary.*

| | |
|---|---|
| Sodio-pyrophosphate of iron | 24 parts. |
| Citric acid | 60 parts. |
| Sodium bicarbonate | 60 parts. |
| Sugar in moderately fine powder | 120 parts. |

Mix the substances and warm them very gently in a porcelain mortar with continuous trituration until the mass agglutinates. After cooling pass the granular mass through a moderately fine sieve. Protect from light.—Am. Drug., 1891, 298.

*Granular Effervescent Salts—American and English.*—W. T. Thackeray states that the American salts can not compete with the English, by reason of the faulty process of manufacture causing a loss of carbonic acid gas and of permanency. The American process takes advantage of the fact that none of the salts generally used are soluble in alcohol, and those which are soluble must be rejected. To the alcohol is added a very heavy sugar syrup to assist in the more expeditious formation of granulations.

Tartaric acid is used because it is more economical; it is more easily reduced to and kept in powder; and it is insoluble in alcohol. After the powders are mixed and dried, they are treated to a bath of alcohol and syrup sufficient to dampen, and the mass is then stirred vigorously until the granulations form, which are passed through a No. 6 sieve and dried quickly. By this process there is a loss of from 3 to 5 per cent. of carbonic acid gas.—Pharm. Era, 1891.

*Lithii Carbonas Effervescens.*—(Granulated carbonate of lithium).—Germ. Unoff. Form.

| | |
|---|---|
| Lithium carbonate | 10 parts. |
| Sodium bicarbonate | 30 parts. |
| Tartaric acid | 20 parts. |
| Sugar | 40 parts. |
| Alcohol | 40 parts. |

Mix the solids reduced to a No. 70 powder, add the alcohol, and knead it until it is converted into a coarsely granular, crumbly mass. Rub this through an enamelled colander, or through a tinned metal sieve having 10 meshes to the lineal inch ("having meshes 2 mm. wide"), and then dry it, first at 20° and afterwards at 40° C.—Am. Drug., 1891, 377.

*Magnesii Boro-Citras—German Unoff. Form.*

| | |
|---|---|
| Magnesia, calcined | 3 parts. |
| Boric acid, in moderately fine powder | 3 parts. |
| Citric acid, in moderately fine powder | 10 parts. |
| Water | 4 parts. |

Mix the solids, and afterwards incorporate the water. When the doughy mass has hardened (which will require only a short time), reduce the mass to a powder.

A white powder of a faintly bitterish taste and slightly acid reaction. When heated the salt swells and then carbonizes. If dilute hydrochloric acid is poured upon the carbonized mass, the liquid filtered off, and the filtrate supersaturated with ammonium carbonate solution, the addition of sodium phosphate solution will produce a white precipitate.—Am. Drug., 1891, 377.

With a small quantity of water the powder yields a mushy solution. In several times its weight of water it dissolves to a clear liquid.

If a small portion of the salt be treated with a drop of hydrochloric acid and a few centimetres of alcohol, and the latter then ignited, the flame will show a green border.

A solution of 1 gm. of the salt in 1 c.c. of water, after being acidulated with acetic acid, and afterwards mixed with 1 c. c. of potassium acetate solution, should remain clear, even after shaking. The filtrate obtained by treating the carbonized mass with dilute hydrochloric acid, when supersaturated with ammonium carbonate, should not become cloudy.

*Scale Salts.*—F. B. Power made an observation in scaling pyrophosphate of iron, which probably will be of use in the scaling of other salts. When the mass spread upon the glass adheres like a varnish, and refuses to separate from it, the separation may at once be initiated by the simple application of the warm hand to the under side of the glass. This depends on the temporary rapid expansion of the glass by the momentary application of a gentle heat.—Pharm. Rundschau, N. Y., 1891, 212.

*Sal Carolinum factitium Crystallisatum—(Artificial Carlsbad Salt)—German Unoffi. Formulary.*

| | |
|---|---|
| Sodium sulphate (cryst.) | 5 parts. |
| Sodium carbonate (cryst.) | 2 parts. |
| Sodium chloride | 1 part. |
| Hot water | 12 parts. |

Dissolve the salts in hot water, filter the solution, and evaporate it until a film begins to form on the surface; then set it aside to crystallize. Separate the crystals from the mother-liquor, and transfer them without washing them with water, to bottles. The mother-liquor is to be thrown away. The resulting crystals are soluble in 2.5 parts of water.—Am. Drug. 1892, 61.

*Carlsbad Salt—Examination of the Artificial Salt (Ph. Germ.)*—W. Kubel states that for the examination of the officinal salt (P. G.) it suffices to determine the specific gravity of a 12½ per cent. solution at 15° C. and to estimate the sodium chloride and the bicarbonate. He proceeds as follows:

Dissolve 25 gm. in sufficient water to make 200 gm., and take the specific gravity at 15° C., which should be about 1.1037 (this was determined by several trials); 5 gm. of this solution should not require more than 19.5 c.c. of normal silver solution; and 20 gm. should not require less than 10.7 c.c. of normal hydrochloric acid. The officinal salt of Ph. Germ. is composed of 22 parts of dry sodium sulphate, 1 part of potassium sulphate, 9 parts of sodium chloride, and 18 parts of sodium bicarbonate—all in dry powder. The composition of crystalline salt would be 55.55 parts of crystallized sodium sulphate, 1.11 parts of potassium sulphate, 10 parts of sodium chloride and 33.33 of crystallized sodium carbonate.

Natural salt: 45 gm. of the crystals, dissolved to 200 gm., had a specific gravity of 1.0964. 10 gm. of the solution required 0.6 c.c. of normal silver solution, corresponding to 0.15 p. c. of sodium chloride; 20 gm. required 3 c.c. of normal hydrochloric acid, corresponding to 9.53 p. c. of crystallized sodium carbonate. A crystallized artificial salt showed a specific gravity of 1.0934, and contained 0.13 per cent. of sodium chloride and 5.7 per cent. of crystallized sodium carbonate.

These results show that the crystallized Carlsbad salt, whether natural or artificial, is chiefly a more or less impure sodium sulphate.

It is, of course, taken for granted that the salt has previously been tested

for impurities (metals and other foreign substances).—Archiv Pharm., 1891, ccxxix., 588.

SPIRITUS.

*Spirit of Nitrous Ether—Preparation.*—George J. Harvey prepares it by decomposing sodium nitrite with sulphuric acid in the presence of alcohol. Sodium nitrite is easily prepared by heating commercial sodium nitrate (nearly free from chlorides).

| | |
|---|---|
| Sodium nitrite in coarse powder | 4 av. ozs. |
| Distilled water | 12 " |
| Alcohol | 32 ' |

Place in a retort or flask with a few fragments of glass, connect the retort with a well-cooled condenser, and this in turn with a receiver surrounded by ice. The receiver is further connected with two wash-bottles of one pint capacity, containing respectively ½ and ¼ pint of alcohol, the inlet tubes barely touching the surface of the liquid. In another flask is contained a mixture of 2 av. ozs. of sulphuric acid and 16 av. ozs. of alcohol, which flask is connected with the retort by means of a tube, drawn out to a fine point, the point reaching to within two or three inches of the sodium nitrite mixture. The retort is heated on a water-bath up to 80° C., and the mixture of acid and alcohol is allowed to enter in a very fine stream (better, rapidly dropping). The reactions with the above quantities, were completed in about one hour, and averaged about 22 av. ozs., which by the nitrometer tested about 17 per cent. of ethyl nitrite. The distillate is mixed with the contents of the two wash bottles and sufficient alcohol added to reduce it to 4 per cent. The details are, of course, open to improvement.—Western Druggist, 1892, 87, from Pacific Druggist.

*Spirit of Nitrous Ether—Presence of Copper.*—Charles Schmidt reports a contamination by copper, which was discovered by means of potassium bicarbonate. Schmid was in the habit of adding to each pint of the spirit of nitrous ether a few crystals of potassium bicarbonate, in order to arrest any free acids that might be present, or have a tendency to form. After some weeks he noticed that the crystals were covered with a green precipitate, which proved to be cupric carbonate.—Pharm. Review, 1892, 29.

*Nitrometer Attachment for Burette.*—Eugene A. Sayre has devised a combination of nitrometer and burette, the principal advantage of which is the absence of a flexible joint. It therefore requires no extra support apart from the burette, and it also permits the burette to be shaken or inverted without inconvenience. The apparatus is figured in Am. Druggist, Aug. 1891, p. 247.

The materials used in its construction are a narrow glass syringe (⅜ oz. size is about right), a rubber cork, about 10 inches of small glass tubing, and a few feet of stiff tinned or coppered iron wire.

A perforated rubber cork fits the mouth of the burette. The nozzle of a Phenix syringe body is pushed into the hole of the stopper. A narrow, but stout glass tube has the lower end fused conically, and ground, by the intervention of fine emery and oil of turpentine, into the neck of the syringe nozzle. This glass tube is tightly held in place by a rubber band, engaging a twisted wire-arm, which is inserted into the mouth of the tube. A twisted wire, firmly clasping the syringe barrel at two places, has above a loop through which the tube may be easily raised, and is so firm and rigid that the tube is steadily held in the same position.

The twisted wire attachment is made as follows: Loop the middle of the wire around the syringe, and twist the wires together until a stem about 3¼ inches long is formed, bend the loop at right angles to the stem, and slip over the lower part of the syringe. Now loop the wires around the syringe and back to the starting point, and continue the stem for about 2½ inches; then loop it around the small tube and cut off neatly. The next thing to do will be to determine the capacity of the ungraduated part of the burette. This is done as follows: Fill the burette brimful with distilled water, open the valve in the nitrometer, and force the cork firmly into the top of the burette. Now close the valve, empty the cup (or syringe) again, open the valve, and allow the water to run from the burette into a tared beaker until it is even with the o mark on the burette. The weight of water in grammes equals the capacity in cubic centimeters.

For ordinary use the cup, or syringe, may be graduated by weighing or measuring distilled water into it, but greater accuracy may be obtained by the use of a pipette. A very convenient pipette may be made in the following manner: Select a piece of medium heavy glass tubing of about $\frac{3}{16}$ inch internal diameter, draw it out to a point, cut off, leaving a small orifice, round the edges by fusion, and curve the drawn-out end. The larger orifice is also somewhat contracted by heating. To graduate this pipette, seal the point with a very small quantity of wax, attach the tube to the scale pan in an upright position, counterbalance and weigh into it 3 gm. of distilled water; remove the wax, and allow all of the water to flow into a tared beaker, and blow through the pipette to expel water held in the narrow point by capillary attraction. About 2.968 gm. will be obtained, leaving 32 mgm., the amount of water retained in the tube each time it is used. Now draw the capillary orifice full of water, seal, and introduce enough water to make it contain altogether 3.032 gm. of it, then graduate it by scratching a ring around the tube. If another figure than 32 mgm. is found, this must be substituted for it.

If the work is carefully done, these pipettes are quite accurate.

*Spiritus Thymolini Compositus.*—This is the name proposed for the following substitute for *Listerine*, by C. D. Lippencott:

| | | |
|---|---|---|
| Benzoic acid, | | |
| Sodium biborate, of each | 1 ounce, | 32 grains. |
| Boric acid | 2 ounces, | 64 grains. |
| Distilled water | 48 ounces. | |
| Dissolve, and add | | |
| Thymol | | 160 grains. |
| Eucalyptol, | | |
| Oil of wintergreen, of each | | 40 drops. |
| Oil of peppermint | | 24 drops. |
| Oil of white thyme | | 8 drops. |
| Previously dissolved in | | |
| Alcohol (94 p. c.) | | 24 ounces. |
| Mix, add, | | |
| Caramel | | 10 drops. |
| Distilled water, suff. to make | | 1 gallon. |

After 24 hours pass through a wetted filter.—Pharm. Record, 1891, xii., 452.

*Cologne—Formulary of the German Pharm. Soc.—*

| | |
|---|---|
| Oil of Bergamot | 20 parts. |
| " Lemon | 20 " |
| " Musk (2 per cent.) | 5 " |
| " Neroli | 2 " |
| " Cinnamon (Ceylon) | 1 part. |
| " Cloves | 1 " |
| " Rose | 1 " |
| Alcohol (deodorized) | 1800 parts. |
| Water | 150 " |

Mix them; put the mixture aside for eight days in a cool place, frequently shaking; finally filter.—Am. Drug., 1891, 332.

——— The following Cologne is peculiar in that it contains oil of caraway:

| | |
|---|---|
| Oil of caraway | 10 parts. |
| " cassia | 10 " |
| " cloves | 10 " |
| " rosemary | 10 " |
| " lavender | 40 " |
| " bergamot | 260 " |
| " lemon | 130 " |
| Alcohol (90 p. c.) | 11000 " |
| Distilled water | 750 " |
| Oil of neroli | 2 " |

Mix.

Stated to be a close approximation to Johann Maria Farina.—National Druggist, 1892, 57, from Seifenfabrikant.

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| | |
|---|---|
| Oil of bergamot | 2 drachms. |
| " lemon | 80 minims. |
| " lavender (English) | 30 " |
| " rosemary (English) | 30 " |
| " neroli | 15 " |
| Alcohol | 2 ounces. |
| Dissolve, and add, | |
| Musk | 5 grains. |
| Rubbed up with, | |
| White sugar | 10 grains. |
| Oil of origanum, white | 15 minims. |
| Orange flower water (triple) | 2 ounces. |
| Alcohol | 20 ounces. |

Mix.

—Chem. Drug.

Collections of *Cologne* formulas will be found in Pharm. Record, 1892, xiii., 213, 332; Am. Drug., 1892, 61; and in Pharm. Era, 1892, 45, 76.

*Bay Rum.*—Several formulas will be found in Pharm. Era, 1892, 45.

*Lavender Water*—

| | |
|---|---|
| English oil of lavender | ½ ounce. |
| Oil of bergamot | 2 drachms. |
| Essence of ambergris | 1 drachm. |
| " musk (10 grs. to 1 oz.) | 1 drachm. |
| Oil of angelica | 2 drops. |
| " rose | 6 drops. |
| Alcohol | 20 ounces. |

Filter after a fortnight.

*Lavender Water (Squire).*—

| | |
|---|---|
| English oil of lavender | 12 drachms. |
| Oil of bergamot | 4 drachms. |
| Tincture of ambergris | 4 drachms. |
| Alcohol | 40 ounces. |

Mix.

—Chem. Drug., 1892.

——— Other formulas will be found under the above mentioned references.

*Essence of Hyacinth.*—

| | |
|---|---|
| Hyacinthin | 60 parts. |
| Oil of neroli, bigarade | 10 " |
| Tincture of musk | 50 " |
| Tincture of benzoin | 100 " |
| Extract of jasmin (triple) | 500 " |
| Alcohol deodorized | 3000 " |
| Orange flower water (triple) | 300 " |

—Am. Drug., 1891, 316.

*Extract of Ylang-Ylang.*—

| | |
|---|---|
| Oil of ylang-ylang | 370 grains. |
| " neroli (petale) | 48 drops. |
| " rose | 115 " |
| " lemon | 48 " |
| Musk | 16 " |
| Alcohol (deodorized) | 30 pints. |

Mix.

("Drops" are a rather uncertain quantity.)—Am. Drug., July 1891, 218, from N. Erfind. und Erfahr.

*Extract of Patchouly.*—

| | |
|---|---|
| Oil of patchouly | 60 parts. |
| " rose | 12 " |
| Camphor | 1 part. |
| Alcohol | 5000 parts. |

Mix.

—Chem. Drug., 1892.

*Elder-flower Perfume.*—In the following "extrait," advantage has been taken of the remarkably close resemblance of the odor of terpineol to that of elder-flowers.

| | | |
|---|---|---|
| Triple extract of jessamine | 200 | parts |
| " rose | 200 | " |
| " tuberose | 200 | " |
| " jonquille | 200 | " |
| " orange flowers | 200 | " |
| Oil of ylang-ylang | 0.1 | " |
| Tincture of musk | 2.5 | " |
| " ambergris | 2.5 | " |
| Terpineol | 5 | " |
| Previously dissolved in | | |
| 96 per cent. alcohol | 60 | " |

Mix.

—Pharm. Centralhalle, 1891, 503, from Seifenfabrikant.

*Persian Essence.*—

| | | |
|---|---|---|
| Oil of bergamot | 6 drachms, | 40 minims |
| " lemon | 5 " | |
| " lavender, Mitcham | 3 " | 20 " |
| " rose | 1 " | 20 " |
| " cloves | | 40 " |
| " nutmeg | 3 " | 20 " |
| Essence of musk (10 grs. to 1 oz.) | 2½ ounces. | |
| Spir. rectif. | 20 " | |

Mix.

—Chem. Drug., 1892, Jan., 124.

"*Pine Spray.*"—An excellent spray for sick-rooms, etc., leaving a balsamic odor of pine forests, is the following, communicated by F. Hoffmann. Dissolve in 900 parts of alcohol 80 parts of oil of pine needles

(Pinus silvestris), 10 parts of oil of juniper berries, 5 parts of oil of rosemary, 3 parts of oil of lavender, and 2 parts of the oil of lemon. The oils must all be of the finest quality.—Pharm. Rundschau, N. Y., 1891, 294.

*Anæsthetical Spray.*—Dobisch recommends the following for its rapid action, which persists for two to six minutes. Menthol 1 part, ether 15 parts, chloroform 100 parts; all by weight.—Pharm. Post, 1891, 1137.

*Spray for the Sick-Room.*—Dr. Richardson gives the following formula. To a "ten volumes" solution of hydrogen peroxide, 10 ounces, add 2 drachms of salt. If desired, the spray may be perfumed with an ethereal tincture of kowrie gum, which is stated to give a pine-like odor.—Am. Drug., July 1891, 218.

*Perfumes—Addition of Milk.*—It is well known that the addition of fresh milk to an alcoholic solution of essential oils up to a point where the latter just begin to separate, will make the perfume more "lasting." In order to find out how much milk to add, so as to avoid loss of oils thrown out unnecessarily, it is best to proceed as follows:

When the alcoholic solution of oils is completed, remove a small, exactly measured quantity, say 1 fluidounce. Now add to it, from a measured quantity of water, in a small graduate or burette, small portions at a time, towards the end in drops, until the mixture is distinctly opalescent, without showing oily drops either on the surface or the bottom after standing about one hour. The next point is to ascertain how much milk will have to be taken to equal the amount of water that has been found necessary. Now, cow's milk contains about 88 per cent. of water. Assuming that we have found, by experiment, that we require 15 minims of water to render the alcoholic solution opalescent, we would find the equivalent quantity of milk by multiplying 15 with the modulus 1.055. This is obtained thus: One fluidounce of milk, at about 60° F., and of the specific gravity 1.030, weighs about 470 grains. The latter consist of about 433.6 grains of water (88 per cent.) and 36.4 grains (12 per cent.) of solids. But the 433.6 grains of water equal 455 minims. That is to say, every fluidounce of the milk contains 455 minims of water. We have, therefore, the proportion:

$$445 : 480 :: 15 : x$$
$$x = 15 \times \frac{480}{455}$$
$$x = 15 \times 1.055$$

In this special case, then, $x$ would be 15.825, or practically 16 minims. But the same modulus will hold good for any denomination of measure. The rule then would be, multiply the number of minims, or fluidounces, or pints, etc., of water found required by experiment, with 1.055, and the

result will be the corresponding number of minims, fluidounces, pints, etc., of milk required.—Am. Drug., Aug. 1891, 238.

*Perfumes—Production in the "Riviera."*—The "Gartenflora" (Sept. 1891) contains an account of the culture of flowers and the production of perfumes, of which the following not heretofore noticed facts and figures, may prove interesting.

The yield of volatile oil is given as follows:

| | | | | |
|---|---|---|---|---|
| Neroli flowers | 1,000 kg. | yield | 1.0 | kg. |
| Roses | 25,000 kg. | " | 1.0 | kg. |
| Geranium | 1,000 kg. | " | 1.0 | kg. |
| Mint | 1,000 kg. | " | 0.75 | kg. |
| Orange leaves | 1,000 kg. | " | 1.0 | kg, |
| Lavender | 100 kg. | " | 0.5 | kg. |
| Eucalyptus | 100 kg. | " | 0.5 | kg. |
| Cherry laurel | 1,500 kg. | " | 1.0 | kg. |
| Rosemary | 200 kg. | " | 1.0 | kg. |
| Spike | 120 kg. | " | 1.0 | kg. |
| Cedar | 40 kg. | " | 1.0 | kg. |
| Dried Patchouli leaves | 40 kg. | " | 1.0 | kg. |

The production of flowers and blossoms is calculated to be:

| | |
|---|---|
| Orange-blossoms | 1,860,000 kg. |
| Roses | 1,000,000 kg. |
| Violets | 157,000 kg. |
| Jasmin | 147,000 kg. |
| Tuberoses | 74,000 kg. |
| Jonquil | 50,000 kg. |
| Cassie | 30,000 kg. |
| Mignonette | 20,000 kg. |

The prices of the different flowers, etc. varied during the years 1884–1888, as follows:

| | | | | | | |
|---|---|---|---|---|---|---|
| Orange blossoms (neroli) | from | 0.30 | francs to | 0.50 | francs for | 1 kg. |
| Orange blossoms, bitter | " | 0.70 | " | 1.60 | " | 1 kg. |
| Roses | " | 0.50 | " | 0.80 | " | 1 kg. |
| Jasmin | " | 2.50 | " | 2.75 | " | 1 kg. |
| Tuberoses | " | 2 | " | 4 | " | 1 kg. |
| Violets | " | 2 | " | 5.25 | " | 1 kg. |
| Cassie (*Acacia Farnesiana*) | " | 7 | " | 17 | " | 1 kg. |
| Geranium | " | 5 | " | 10 | " | 100 kg. |
| Orange leaves, sweet | " | 3 | " | 6 | " | 100 kg. |
| Lemon leaves, bitter | " | 12 | " | 15 | " | 100 kg. |
| Cherry laurel | " | 8 | " | 12 | " | 100 kg. |
| Thyme | " | 8 | " | 11 | " | 100 kg. |
| Lavender | " | 7 | " | 12 | " | 100 kg. |
| Mint | " | 10 | " | 14 | " | 100 kg. |
| Rosemary | " | 4 | " | 5.50 | " | 100 kg. |
| Spike | " | 4 | " | 5.50 | " | 100 kg. |

The trade in fresh flowers is of no mean importance, as will be seen from the fact that during the time extending from November 1, 1887, to the end of May, 1888, there were shipped, from the station at Cannes alone, 369.096 kg. of fresh flowers, with a value of 1,858,325 francs, while for the season 1888–89 it reached a value of 2,855,475 francs, or an increase of 997,150 francs over the previous year.

Mignonette, tuberose, jasmin, cassie-flowers, violet and jonquil cannot be distilled, but their perfume is extracted by either the "cold" or the "hot" process. In the cold process the freshly-gathered flowers are spread on a ¼-inch layer of pure lard, which has been placed on a glass plate with wooden frame. Forty to fifty of these frames are placed one above the other, and the flowers, according to the variety under manipulation, changed every 12–48 hours, until the lard is sufficiently perfumed, when it is packed in air-tight containers and ready for commerce.

In the hot process, 20 kg. of fat and about 5 kg. of flowers are placed in a copper container and heated slowly with constant stirring. After heating for about ten minutes, the vessel is allowed to cool, and then 5 kg. of flowers are again added; this is repeated until the fat is sufficiently impregnated with the perfume. The hot fluid is then strained and the remaining fatty mass submitted to hydraulic pressure.—Am. Jour. Pharm., 1891, 479.

SUCCI.

*Fruit Juices—Clarification.*—Dieterich recommends to shake 1 kilo. of the turbid juice with about 20 gm. of powdered talcum, which has to be triturated with a little of the juice before being added to the remainder.—Zeits. Oesterr. Apoth.-Ver., 1892, 314, from Pharm. Zeitg.

*Fruit Juices—Preservation.*—Dhamelincourt preserves fruit juices by heating them to boiling in a copper vessel, and filling them into bottles, leaving a space of about 2 cm. in the neck empty; a little alcohol is poured on top of the hot juice, and the bottles quickly stoppered. The alcohol vapor preserves the juices perfectly. This method may be employed for other saccharine liquids.—Am. Jour. Pharm., 1892, 231; from Jour. Pharm. Chim., 1891, 501.

SUPPOSITORIA, CRAYONS, ETC.

*Crayons, Medicated.*—A collection of formulas for medicated crayons is given in Pharm. Record, 1892, xiii., 323, which will be found also in Proceedings, 1880, xxviii., 49.

*Hard Iodoform Bougies.*—20 iodoform, 6 powdered acacia and 5 powdered sugar are made into a stiff mass with sufficient water, rolled into sticks of suitable thickness, and dried at a gentle heat; it will be necessary to roll them occasionally while drying, in order to keep their shape.

*Pliable Iodoform Bougies.*—10 iodoform, 1 powdered acacia, and 1 pow-

dered tragacanth are made into a stiff mass with dilute glycerin (equal parts glycerin and water). Or: 1 gelatin is heated on a water-bath with 2 glycerin and 1 water until a homogeneous mass is formed, when 4 iodoform are carefully mixed with it, and the mass poured into moulds.

*"Soluble" Iodoform Bougies.*—9 butter of cacao, 1 liquid paraffin are triturated to a mass (without applying heat), 10 iodoform mixed with it, and the mass rolled out to suit.—Suppl. Ph. Neerland.; Pharm. Centralh., 1892, 62.

*Bacilli Iodoformi—German Unoff. Formulary.*—

| | |
|---|---|
| Iodoform, in fine powder | 10 parts. |
| Cacao butter | 9 parts. |
| Castor oil | 1 part. |

Mix them in a gently warmed porcelain mortar, and when the mass has been half cooled, suck it into glass tubes, having a lumen of 3 mm., and place these in cold water. When the mass is cold, push the pencils out, and cut them into pieces or points of 6 cm. (2¾ inches) in length.—Am. Drug., 1891, 297.

*Crayons of Iodoform—Elastic.*—Dr. Guy gives the following formula: Glycerin, 10 drops; distilled water, 16 drops; powdered tragacanth, 1 gm.; powdered iodoform, 12 gm. Beat the gum, glycerin and water to a paste in a mortar, incorporate the iodoform, make into crayons, and dry in an oven at 40–50° C. for two hours. Heat also for half an hour some opodeldoc bottles, their corks, and lycopodium. After these have cooled in the oven, introduce the crayons while still warm, and stopper the vials carefully.—Am. Journ. Pharm., 1892, 314, from Bull. Pharm. Bordeaux, 1892, 58.

*Pessaries, with Tincture of Benzoin Compound.*—Mitchell makes these by melting the butter of cacao (50 grains) adding 30 minims of the tincture, and stirring until globules of alcohol are not longer visible. Evaporation of the tincture by itself produces a sticky resin, which is quite difficult to mix properly with the butter of cacao.—Chem. Drug., March 1892, 367.

*Suppositories of Glycerin.*—George W. Hackenberger triturates 4 parts of exsiccated sodium carbonate and 2 parts of powdered castile soap with 90 parts of glycerin, heating the mass over a water-bath until free from foam, then adds 4 parts of stearin, heats again until free from foam, strains it and pours it into moulds. This makes 90 per cent. suppositories. For 50 per cent. suppositories mix 250 parts of glycerin and 200 parts of water, triturate with 20 parts of powdered soap and exsiccated sodium carbonate (how much?—Rep.), heat over a water-bath as before, and add 15 parts of stearin, heat again, and strain.—Am. Journ. Pharm., 1892, 134.

*Suppositories—Hints.*—J. K. Simmonds gives some hints on the proper way of making suppositories, from which the following are extracted:

*Extemporaneous Moulds from Plaster of Paris.*—First cast some suppositories of white wax, then fill a box of suitable size, about one inch deep with plaster of Paris made very thin with water, and place the wax suppositories at equal distances apart, leaving them half above the plaster; allow to set quite hard, and oil the surface well; now raise the sides of the box by rolling brown paper around it; then pour in more plaster; after it has set, separate the parts, trim with a knife, and boil for at least half an hour in linseed oil to toughen them.

To prevent sticking to the mould, the author recommends olive oil for gelatin suppositories and soap liniment for cacao butter.

*The making.*—The cacao butter is grated fine, and melted over a water-bath (over-heating seems to prevent it from solidifying properly . When quite cool, but of course not hard, work in the solid ingredients; next place the dish over the water-bath for a few seconds until just thin enough to pour into the well-soaped mould.—Chem. Drug., Sept. 1891, 489.

## SYRUPI.

*Syrup—Bulk.*—P. W. Bedford gives the following data from his note book:

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Sugar | 32 ozs. | (troy or avoird. ?), | water | 24 fl. ozs. | = | 45 | fl. ozs. | sp. gr. | 1.273 |
| " | 32 | " | " | " | 20 " | = | 41 | " | " | 1.298 |
| " | 32 | " | " | " | 16 " | = | 37 | " | " | 1.330 |
| " | 28 | " | " | " | 16 " | = | 34½ | " | " | 1.311 |
| " | 24 | " | " | " | 16 " | = | 32 | " | " | 1.290 |
| " | 20 | " | " | " | 16 " | = | 29 | " | " | 1.264 |
| " | 16 | " | " | " | 16 " | = | 26½ | " | " | 1.231 |

—Pharm. Record, 1892, xiii., 214.

*Syrups—Cold Process.*—E. Fowler points out that no special apparatus is necessary. A glass or tin percolator, or even a large funnel, with a notched cork in the neck, covered with a liberal layer of moistened absorbent cotton, is all that is needed. The percolator, or funnel, is filled with granulated sugar, water poured on, and the percolate returned until clear. If the precaution be observed never to have less than two inches of sugar at the bottom of the percolator, the syrup will always be saturated. For soda-water syrups, sufficient fruit juice should be added to make one-fifth of the final product.—Canadian Pharm. Journ., 1891, xxv., 38, from Pharm. Era.

*Gluside—Uses.*—The recently published "Addendum" to the British Pharmacopœia notices saccharin under the term "Gluside." The British Medical Journal contains a list of formulas showing how it can replace sugar, which is reprinted in the Am. Drug. (August 1891, 247). We shall merely give the introductory part. The quantity of gluside equivalent in sweetening power to cane sugar is 1 : 300; medicinally it would vary considerably, from 50 to 80 grains, having been given daily without any injurious

effect; 1½ grains will be found to be the equivalent of 1 ounce of sugar; if a sweeter "syrup" is desired, the "soluble gluside," which is readily soluble, should be employed. This is obtained by dissolving gluside in solution of sodium bicarbonate, and evaporating to dryness; 100 parts of gluside yielding nearly 113 parts of neutral "soluble gluside." Ordinary simple syrup may be replaced by a solution of 30 grains of soluble gluside in 20 fluidounces (1 imp. pint) of water. Gluside cannot take the place of sugar in preparations where the sugar serves as preventive of oxidation.

*Syrups for Soda-water.*—A collection of formulas will be found in Pharm. Era, 1892, 266.

*Syrup of Benzoin.*—Francis F. French prepares a tincture from 2 drachms of benzoin with sufficient of alcohol, and evaporates it to a small bulk, adding 2 drachms of talcum and a little sugar, afterward 4 fl. oz. of water. After filtering, 6 oz. of sugar are dissolved in the filtrate.—Am. Journ. Pharm., 1892, 134.

——— W. E. Gosch considers this syrup an unnecessary preparation, being not as pleasant as syrup of tolu, and medicinally probably not superior to it.—Am. Journ. Pharm., 1892, 134.

*Syrup of Calcium Hypophosphite—German Unoff. Formulary.*—

| | |
|---|---|
| Calcium hypophosphite | 1 part. |
| Sugar | 64 parts. |
| Water | 30 parts. |
| Lime water | 6 parts. |

Are heated to 40°-50° C., until dissolved.

– Pharm. Post, 1891, 860.

*Syrupus Chinæ (Cinchonæ)—German Unoff. Formulary.*—Macerate 4 parts of red cinchona and 1 part of cinnamon (both in coarse powder) for forty-eight hours with 25 parts of red wine at a temperature between 15° and 20° C.; then strain, express, and filter. To 20 parts of the filtrate add 30 parts of sugar, and dissolve.—Am. Drug., 1892, 61.

*Syrupus Eriodictyi (Yerba Santa).*—H. C. Cleveland proposes two formulas for this syrup. One, to be made with his fluid extract (menstruum 3 alcohol, 1 water) by means of calcined magnesia (½ av. oz. to each fluid ounce of the fluid extract). The other formula directs a fluid extract which mixes limpid with simple syrup. The leaves are percolated with a menstruum consisting of 1 part of water of ammonia and 7 parts of water; the percolate is evaporated to a pasty mass with potassium carbonate (20 per cent. of the leaves), and this mass extracted with alcohol.—Yearbook Pharm., 1891, 181, from Western Druggist, 1890, 363.

*Syrupus Ferri Bromidi—Preparation.*—Charles Rice points out that the addition of bromine to the iron, if not very carefully performed, is decidedly risky, and he therefore proposes the following modus operandi:

Introduce the iron into a flask of thin glass of suitable capacity, add to

it 200 parts of distilled water, and afterwards a small quantity (about 2 c.c.) of the bromine contained in a glass-stoppered funnel or burette. Insert a stopper loosely into the mouth of the flask, and gently agitate the contents until the bromine has combined with the iron. Repeat the addition of bromine in small quantities at a time, agitating gently after each addition, and, if necessary, moderating the reaction by cooling the flask with cold water. After all the bromine has been added and no further spontaneous increase of temperature is observed, apply heat to the contents of the flask until they have lost the odor of bromine and acquired a greenish color. Then filter into the sugar, and continue as directed in the U. S. Pharm.—Am. Drug., 1892, 30.

*Syrup of Iodide of Iron—Preparation.*—Hugo W. C. Martin gives the following process for making this syrup expeditiously, requiring but twenty minutes:

| | |
|---|---|
| Iodine | 480 grains. |
| Citric acid | 10 grains. |
| Distilled water | 1 ½ fl. ozs. |
| Iron (by hydrogen, or finely powdered) | 150 grains, or sufficient. |
| Syrup sufficient to make | 10 fl. ozs. |

Place the iodine in a suitable flask, and proceed as usual, taking care, however, to add the iron in small portion at the time, to prevent a too violent reaction. While this reaction is going on, the syrup should be heated to near the boiling point, and the finished solution of the ferrous iodide filtered immediately into the hot syrup. Dissolve the citric acid in about one fluid drachm of water, and add to the finished syrup.—Western Druggist, 1892, 86.

——— Siboni prepares it in the usual way from 41 parts of iodine, 20 parts of powdered iron, 150 parts of water, 500 parts of solution of glucose (42° B. about sp. gr. 1.400), and 9300 syrup.—Schweiz. Woch., 1892, 36, from Bollet. Farm. (This is about ½ per cent. ferrous iodide.—Rep).

——— E. A. Warren makes use of hypophosphorous acid, but applies it in a peculiar way.

| | |
|---|---|
| Iodine | 2 troy ozs. |
| Iron wire | 4½ dr. |
| Water | 4 fl. ozs. |
| Diluted hypophosphorous acid | 2 fl. dr. |
| Syrup, sufficient to make | 16 fl. ozs. |

Make the iron iodide solution in the usual way, and filter it *into* the acid, then add sufficient syrup.—Pharm. Record, 1892, xiii., 89.

——— *Preservation.*—A. L. Beck preserves his syrup by carbonic acid gas. He puts the syrup into a pint douche bottle, provided with pinchcock at the lower orifice, for drawing the syrup as required, and a rubber

tube at the top supplied with carbonic acid gas from an improvised generator. Beck prefers this method to the layer of olive oil, which makes it troublesome to clean the bottles.—Am. Journ. Pharm., 1892, 18.

——— A. P. Micas protects his syrup by the addition of citric acid—1 drachm to twenty fluid ounces; and, as an additional precaution, keeps the syrup in two-ounce vials in the daylight, and in a cool place.—Pharm. Era, 1892, 263.

*Syrup of Iodo-lactophosphate of Iron and Calcium.*—Siboni prepares it as follows: Dissolve 1468 parts of monophosphate of calcium and 556 parts of ferrous sulphate separately in sufficient water, mix the solutions, allow them to stand in a lukewarm place for two days, add 2,000 parts of lactic acid (25° B. about sp. gr. 1.205), filter, add water up to 35,000 parts, and make into syrup with 65,000 parts of sugar, so as to make 100,000 parts by weight.—Schweiz. Woch., 1892, 37; from Bollet. farm.

*Ferrous Syrup of the Hypophosphites—Improved Process.*—In a former article (see Proceedings 1891, xxxix., 329), F. W. Haussmann states that a syrup, made according to the formula given, always gradually precipitated, presumably ferric hypophosphite. On further investigation the precipitate was found to be calcium sulphate, which is retained in the ferrous solution with great tenacity. Various methods of separating the calcium salt gave but partial results, enough being retained always to interfere with the attempt to prepare a stable syrup. As a last resort an excess of calcium hypophosphite was added to the ferrous solution, on which addition the greater portion of it was precipitated, and the following process accordingly formulated:

| | |
|---|---|
| Ferrous sulphate, crystallized | 64 grs. |
| Calcium hypophosphite | 40 grs. |

Dissolve each separately in 12 drams of distilled water, mix, and allow the $CaSO_4$ to precipitate, which will be hastened by exposure to cold. Filter, and to the filtrate add calcium hypophosphite 180 grs., aiding the solution of the salt by an addition of 5 grs. of citric acid or 2 drams of 10 per cent. hypophosphorous acid. Allow to stand from 12 to 24 hours, in which time the greatest portion of the $CaSO_4$ will precipitate, and add 60 grs. each of potassium and sodium hypophosphite; filter, and in the filtrate dissolve 5 oz. avoir. of sugar, by agitation without heat. By this method all but a slight amount of $CaSO_4$ is precipitated out, and merely slight traces are found in the finished syrup. An excess of acid is necessary to dissolve a small amount of ferric hydrate formed during the operation, due to impurities in the commercial calcium hypophosphite; otherwise the syrup will gradually deposit ferric hydrate. With citric acid the syrup will be a light green color; with hypophosphorous acid will be colorless. An addition of an equal weight (corresponding to the amount of ferrous hypophosphite present) of potassium or sodium citrate gives a handsome bright-green color to the syrup.—Am. Jour. Phar., 1891, 278.

*Syrup of Raspberries.*—E. Dieterich gives the following method: Bruise 1,000 parts of raspberries, allow the pulp to stand during two days at the ordinary temperature, and then express the liquid portion. Add to this 20 parts of sugar, and when it is dissolved fill the juice into narrow-necked bottles so as to reach up to the neck; put parchment-paper over their mouths and allow to ferment at ordinary temperature (indoor) until no more carbonic acid gas is given off, or until a sample of the juice is no longer rendered turbid when mixed with half its volume of alcohol; then filter. Next heat 500 parts of sugar in 330 parts of distilled water, boiling to a "thread," then add sufficient water, and boil so as to obtain a product of 580 parts; add 7½ parts of citric acid, and afterwards 450 parts of the filtered juice. Raise once to boiling, skim carefully, and strain through flannel.—Yearbook Pharm., 1891, 270, from Chem. Drug., 1890.

*Syrup of Senna.*—Charles Caspari is not satisfied with the officinal process, and proposes the following:

| | |
|---|---|
| Senna leaves | 33 troy ounces. |
| Boiling water | 36 pints. |
| Alcohol | 14 fluid ounces. |
| Sugar | 56 troy ounces. |
| Oil of coriander | 20 grains. |

Upon the senna leaves pour 24 pints of boiling water, cover well and stand 6 hours, express, and upon the residue pour 12 pints of boiling water, cover well and after 3 hours express, and evaporate the mixed liquids at 140° F. to 40 fluid ounces. When cold add 10 fluid ounces alcohol, set aside covered over night. By filtration remove the precipitated matter, washing the filter with a mixture of alcohol 1 part, water 4 parts, to make 40 fluid ounces. To this add 4 fluid ounces alcohol, holding the oil coriander in solution, transfer to a bottle of sufficient capacity to hold the liquid and the sugar, and dissolve the latter by shaking.—Pharm. Record, 1892, xiii., 187, from Pharm. Review, 1892, 49.

*Syrup of Peru Balsam.—German Unoff. Formulary.*—

| | |
|---|---|
| Balsam Peru | 1 part. |
| Digest with | |
| Hot water | 10 parts |
| For twenty-four hours at 15° to 20° C., and filter. | |
| In the filtrate | 8 parts. |
| Dissolve | |
| Sugar | 20 parts. |

*Syrup of Tolu Balsam* (*German Unoff. Formulary*) is to be made in the same way from 1 part of finely powdered balsam tolu.—Pharm. Post, 1891, 860.

———M. A. Xanthopoulos prepares this syrup as follows:

| | | |
|---|---|---|
| Balsam of tolu | 50 | parts. |
| Ether | 50 | " |
| Glycerin | 100 | " |
| Simple syrup | 200 | " |

Dissolve the balsam in the ether and add the glycerin, cork the flask loosely, and leave the mixture in contact for six days, agitating it strongly and frequently. Transfer the liquid to a funnel provided with a stop-cock, allow to stand until separated, remove the supernatant balsamic liquid and add the syrup to the glycerin which now contains all the soluble portion of the balsam. Strain and preserve. This concentrated syrup may be diluted as desired.—National Druggist, 1892, 155.

*Syrup of Iodide of Iron—Discolorations Due to Starch.*—Theodore Salzer noticed that the syrup, prepared according to Ph. German. III., soon acquired a reddish-yellow color, while that prepared according to the Ph. Germ. II. remained colorless. At first he supposed the coloration to be due to the formation of ferric oxy-iodide, but on closer investigation he found the cause in the filtering paper; the old filters soon changing to a dark-red. Nearly all filtering paper contains starch (or amylo-dextrin) which is dissolved by the ferrous iodide solution without coloration, but by the action of the oxgen of the air iodine is set free—$FeI_2 + 2H_2O + O = Fe(OH)_3 + I + HI$—and iodized starch is formed, mixed with hydrated ferric oxide. The reason why the syrup according to Ph. German II., remains colorless is because the syrup is directed to be boiled. Salzer would therefore suggest that all filtering paper be tested with iodine water; the presence of starch will be annoying also with other preparations.—Pharm. Zeitg., 1892, 224.

——— *As Test for Alkalies.*—According to Th. Salzer the above-named preparation, when fresh, makes a very delicate test for the carbonates and caustic alkalies, ammonia, etc. A single drop suffices, by the yellowish coloration it produces, to detect, in 10 c.c. of a liquid, very small amounts of alkali, such as otherwise could only be identified by means of phenolphthalein. The reaction speedily converts the finely-divided ferrohydrate which had been separated by the alkali, into a ferrihydrate. When the syrup is kept too long, it develops free hydriodic acid, by which this sensitiveness is lost.—Drug. Circ., 1891, 279, from Pharm. Zeitg.

## TINCTURÆ.

*Tinctures—Comparison.*—H. W. Snow has prepared a table, comparing the tinctures of the U. S. Ph., 1870 and 1880, the National Formulary, Pharm. Germanica, Pharm. Gallica (Codex), Pharm. Brit., and the Eclectic Dispensatory, which may be consulted in Drug. Circ., 1891, 222–224.

*Tinctures.*—H. Beckurts calls attention to the necessity of some kind

of a check for tinctures, to insure more uniformity in strength, than at present obtains. In support of his proposition he instances the following difference in the percentages of dry extract:

| | |
|---|---|
| Tincture of aconite leaves | 1.75 to 3.11 |
| " arnica flowers | 1.10 to 1.90 |
| " benzoin | 12.22 to 16.93 |
| " cinchona | 3.97 to 4.90 |
| " myrrh | 4.20 to 6.70 |
| " ginger | 2.30 to 4.90 |

—Apoth.-Zeitg., 1891, 539.

See also under *Extracta; Standardization.*

*Tinctures—from Fluid Extracts.*—B. W. Petsche has compared the formulas given in the formularies of the various fluid extract houses with the officinal ones, and shows the often very wide variations.—Pharm. Era, 1892, 228, 260.

*Tinctures—Proper Menstrua and Assay.*—E. H. Farr and R. Wright, in continuation of their investigations of the solvent action of alcohol of different degrees of strength on some of the drugs used in making pharmacopœial tinctures (see Proceedings 1891, xxxix, 332, 333) as applied to alkaloidal tinctures, have aimed at ascertaining: (1) what menstruum is best adapted for the exhaustion of the drug; (2) the average content in alkaloid and extractive of tinctures prepared with alcoholic menstrua of different strengths; (3) the comparative value of alternative processes for the preparation of tinctures.

*Assay.*—Fifty c.c. of the tincture is evaporated in a porcelain capsule over a water-bath to a low-bulk; water being added, if necessary, until all the alcohol is removed. The residual liquor is allowed to cool, and (in order to remove coloring matter) is then acidified by the addition of 1 c.c. of semi-normal sulphuric acid, and the liquid filtered through cotton wool into a separating funnel. The dish and funnel are rinsed first with a little acidulated water and then with 15 c.c. of chloroform, the rinsings added to the contents of the funnel, and the whole well shaken. After separation the chloroform is drawn off, and the process repeated with 10 c.c. of chloroform. The washings are mixed and freed from traces of alkaloid by shaking with three successive small portions of acidulated water, which are separated and added to the original solution. The latter is then made alkaline with ammonia, and the alkaloids extracted with three successive 15 c.c. of chloroform. To obtain the alkaloids in a pure condition, they are withdrawn from the solution in chloroform by agitation with three successive small portions of acidulated water, the mixed acid solutions made alkaline with ammonia, and the alkaloids taken out by agitation first with 10 c.c., and then with two successive 5 c.c. of chloroform. The mixed alkaloidal solutions are afterwards shaken with ammoniated

water, and after separation are drawn off and evaporated over a water-bath, and the alkaloidal residue heated at 100° C., until the weight is constant.

The *Extractive* is ascertained by evaporating 10 gm. of the tincture, drying the residue at 100° C. to constant weight, and multiplying the result by ten.

*Preparation.*—Four processes for preparing the tinctures were tried: (*a*) Seven days' maceration; (*b*) Double maceration, first with half the menstruum for 48 hours, then separating the fluid portion by pressure and macerating the marc with the remaining menstruum for 24 hours, expressing, mixing the two liquids, and making up to the total volume with the menstruum; (*c*) Maceration and percolation (the Br. Ph. process); (*d*) Continuous percolation (U. S. Ph. process); all the processes in the proportion of 1 : 8.

They also noted the behavior of the tinctures on mixing 1 volume with 3 volumes of alcohol and also with 2 volumes of water. For further particulars see under the respective tinctures.—Pharm. Jour. Trans., 1891.

*Tincture of Aconite—Best Menstruum.*—E. H. Farr and R. Wright examined tinctures made from eleven different samples of aconite root, following the method outlined above (see *Tinctures, proper menstrua*). The average results obtained were as follows:

| Menstruum. | Alkaloid in gm. from 100 c.c. of tincture. | Extractive in gm. |
|---|---|---|
| 90 p. c. | .050 | 2.30 |
| 80 p. c. | .056 | 2.77 |
| 70 p. c. | .062 | 3.12 |
| 60 p. c. | .055 | 3.21 |
| 50 p. c. | .050 | 3.27 |

The results of experiments on the proper process for making the tincture:

| Process. | Alkaloid, p. c. | Extractive p. c. |
|---|---|---|
| Maceration | .044–.052 | 2.26-3.37 |
| Double maceration | .046–.054 | 2.28–3.36 |
| Maceration and percolation (Ph. Br. process) | .048–.054 | 2.46–3.76 |
| Continuous percolation (U. S. Ph. process) | .048–.058 | 2.84–3.88 |

The authors therefore recommend a 70 per cent. alcoholic menstruum and continuous percolation. The alkali used to liberate the alkaloid was

not ammonia, but potassium carbonate.—Phar. Jour. Trans., May 1891, 1037.

*Tincture of Belladonna—Best Menstruum.*—E. H. Farr and R. Wright. As the mucilaginous matter present in the tinctures, made with 40, 50, and 60 per cent. alcohol, greatly interferes with the estimation, because it so easily causes the chloroformic mixture to emulsify, it is advisable to evaporate the tincture to a thin syrup, separate the mucilaginous matter by the addition of strong alcohol, filter, wash, and then proceed as detailed under *Tinctures.*

The average results were as follows:

| Menstruum. | Alkaloid in gm. from 100 c.c. of tincture. | Extractive in gm. |
|---|---|---|
| 80 p. c. | .024 | 1.112 |
| 70 p. c. | .024 | 1.20 |
| 60 p. c. | .0246 | 1.24 |
| 50 p. c. | .0248 | 1.24 |
| 40 p. c. | .0246 | 1.23 |

The proper process:

| Process. | Alkaloid p. c. | Extractive p. c. |
|---|---|---|
| Maceration | .022–.024 | .86–1.38 |
| Double maceration | .024–.028 | .91–1.40 |
| Ph. Br. process | .025–.028 | .90–1.44 |
| U. S. Ph. process | .026–.028 | .96–1.46 |

A 50 per cent. alcohol appears to be the best menstruum, while in regard to the processes there seems to be so little difference in the results that either double maceration or the U. S. Ph. process will exhaust the leaves perfectly.—Pharm. Jour. Trans., Dec. 1891, 469–473.

*Tinctura Caffeinæ composita.*—Peco tea, 10 parts, macerate with diluted alcohol, 100 parts, for ten days; strain and dissolve in it caffeine, 1 part. —Pharm. Zeitg., 1892, 123.

*Tincture of Cinchona—Estimation of Alkaloids.*—A fluid ounce of the tincture is mixed with 20 grains of freshly prepared slaked lime, and evaporated to dryness. The dry residue is reduced to powder, mixed with a little sand, and extracted with boiling chloroform; the chloroformic solution is filtered and evaporated. The residue is weighed.—Pharm. Journ. Trans., 1890, 339.

*Tincture of Colchicum Seed (Farr & Wright).*—See under *Tincturæ.* (After the addition of sulphuric acid, remove the fatty oil by shaking with

light petroleum ether; then make the solution alkaline with ammonia, and proceed as above stated.) Average results:

| Menstruum. | Alkaloid in gm. from 100 c.c. of tincture. | Extractive in gm. |
|---|---|---|
| 80 p. c. | .073 | 2.17 |
| 70 p. c. | .075 | 2.16 |
| 60 p. c. | .078 | 1.86 |
| 50 p. c. | .083 | 1.79 |
| 40 p. c. | .078 | 1.80 |

| Process. | Alkaloid p. c. | Extractive p. c. |
|---|---|---|
| Maceration | .051–.072 | 1.24–1.88 |
| Double maceration | .057–.080 | 1.28–1.98 |
| Ph. Br. process | .056–.078 | 1.23–1.83 |
| U. S. Ph. process | .060–.095 | 1.47–2.19 |

The authors recommend a 50 per cent. alcoholic menstruum, and continuous percolation.—Pharm. Journ. Trans., April 1891, 957.

——— *Whole or Ground.*—In order to settle the question, whether a tincture made from the whole seeds is as active as one from the ground seeds, R. A. Cripps made 1 pint (20 fl. oz.) of each by maceration, the ground seeds being in No. 20 powder. The tinctures were filtered, but not pressed, nor made up to the full bulk, and measured respectively 18½ and 16 fluid ounces. The total solids and colchicine and colchiceine were estimated with the following results:

| | | |
|---|---|---|
| Total solids, whole seeds | 0.52 | per cent. |
| " No. 20 powder | 1.50 | " |
| Colchicine and colchiceine, whole seeds | 0.028 | " |
| " " No. 20 powder | 0.084 | " |

—Pharm. Journ. Trans., Oct. 1891, 364.

*Tincture of Conium.—Farr and Wright.*—50 c.c. are mixed with 1 c.c. of normal sulphuric acid, and evaporated until the alcohol is driven off. The solution is then shaken in a separating funnel with chloroform, the chloroformic layer drawn off, and the remaining acid solution shaken with 2 c.c. of ammonia, and the liberated alkaloids taken up by shaking with chloroform. The chloroformic solution of the alkaloid is run into 10 c.c. of a saturated solution of dry hydrochloric acid gas in chloroform, the end of the funnel being allowed to dip beneath the surface of the acid chloroform. The chloroformic solution is evaporated in a current of air, and finally heated at a temperature not exceeding 90° C., until it ceases to lose weight.

Eleven samples of the tincture from the seed gave the following average results:

| Menstruum. | Alkaloid in gm. from 100 c.c. of tincture. | Extractive in gm. |
|---|---|---|
| 90 p. c. | .788 | 1.29 |
| 80 p. c. | .866 | 1.56 |
| 70 p. c. | .860 | 1.79 |
| 60 p. c. | .830 | 1.89 |
| 50 p. c. | .760 | 1.95 |

The proper process:

| Process. | Alkaloid p. c. | Extractive p. c. |
|---|---|---|
| Maceration | .072–.091 | .52–2.24 |
| Double maceration | .074–.087 | .58–2.32 |
| Ph. Br. process | .078–.098 | .62–2.76 |
| U. S. Ph. process | .082–.100 | .66–2.68 |

A 70–80 per cent. alcoholic menstruum and continuous percolation give the best results.—Pharm. Journ. Trans., March 1891, 858.

*Tinctura Hæmostyptica.*—H. Fritsch proposes the following:

| | |
|---|---|
| Powdered ergot | 10 parts. |
| Rectified spirit | 20 parts. |
| Sulphuric acid | 2 parts. |
| Boiling water | 500 parts. |

Infuse the ergot in the acid and water for two hours, evaporate to 182 parts, add the spirit, and 30 parts of syrup of cinnamon. The dose is one ounce.—Year-Book Pharm., 1891, 272, from Therapeut. Monatsh.

*Tincture of Hyoscyamus—Best Menstruum.*—E. H. Farr and R. Wright, in their investigation, followed the method as outlined above (see *Tinctures*, proper menstrua), and arrived at the following results, being the average of twelve samples:

| Menstruum. | Alkaloid in gm. from 100 c.c. of tincture. | Extractive in gm. |
|---|---|---|
| 80 p. c. | .0104 | 2.90 |
| 70 p. c. | .0105 | 3.28 |
| 60 p. c. | .0103 | 3.52 |
| 50 p. c. | .0102 | 3.68 |
| 40 p. c. | .0104 | 3.56 |

The results on the proper process for making the tincture:

| Process. | Alkaloid in p. c. | Extractive p. c. |
|---|---|---|
| Maceration | .0135 | 3.68 |
| Double maceration | .0140 | 4.08 |
| Maceration and percolation (Ph.Br.) | .0140 | 4.22 |
| Continuous percolation | .0160 | 4.66 |

They recommend therefore 50 per cent. alcohol as the best menstruum, and that the standard be fixed at .01 per cent. For the sake of comparison they have estimated the alkaloid in tinctures (with a 60 per cent. menstruum) from (1) fresh seeds; (2) recently dried fresh leaves; (3) the dried cortical portion of the root (all 1 : 8).

| | | | |
|---|---|---|---|
| From the seeds | 100 c.c. | .015 gm. | of alkaloid. |
| " leaves | 100 c.c. | .013 " | " |
| " root-bark | 100 c.c. | 0.20 " | " |

As the mucilaginous matter present in tinctures made with the 40, 50 and 60 per cent. menstrua greatly interferes with the estimation because it easily produces an emulsion with chloroform, it is advisable to evaporate the tincture to a thin syrup, separate the mucilaginous matter by the addition of strong alcohol, filter, wash and proceed as above.—Pharm. Journ. Trans., Sept. 1891, 255–257.

*Tincture of Iodine.*—R. T. Ward examined several samples from Philadelphia stores, and found the percentage of iodine (which should be 8 per cent.) varying from 3.08 to 16.15.—Am. Journ. Pharm., 1892, 183.

*Tincture of Jaborandi.—Farr and Wright.* According to the method outlined above, they obtained the following average results:

| Menstruum. | Alkaloid in gm. from 100 c.c. of tincture. | Extractive in gm. |
|---|---|---|
| 80 p. c. | .082 | 4.32 |
| 70 p. c. | .089 | 4.65 |
| 60 p. c. | .095 | 4.95 |
| 50 p. c. | .105 | 5.08 |
| 40 p. c. | .103 | 5.13 |

| Process. | Alkaloid, p. c. | Extractive p. c. |
|---|---|---|
| Maceration | .100–.120 | 3.38–4.62 |
| Double maceration | .112–.124 | 4.38–4.68 |
| Maceration and percolation (Ph. Br. process) | .124–.138 | 5.14–5.42 |
| Continuous percolation (U. S. Ph. process) | .136–.154 | 5.88–6.10 |

The authors therefore recommend a 50 per cent. alcoholic menstruum and continuous percolation. Owing to a mucilaginous matter extracted by 40, 50, and 60 per cent. alcohol, and which easily emulsifies with the chloroform, it is advisable to evaporate the tincture to a thin syrup, and separate the mucilage by the addition of strong alcohol, filter, wash, and proceed as above mentioned.—Pharm. Jour. Trans. July 1, 1891.

*Tincture of Kino—Extemporized.*—P. W. Bedford states that this troublesome tincture can be made as wanted inside of a few minutes.

Kino 50 grains (not powdered, but just as found), alcohol 300 grains, water 75 grains, and glycerin 75 grains, are gently heated in a test-tube until dissolved. This makes a little more than one fluid ounce.—Pharm. Record, 1892, xiii, 287.

*Tincture of Nux-vomica—Commercial.*—B. F. Davenport found in eleven samples the following percentage of extract:

| | | | | | | |
|---|---|---|---|---|---|---|
| Between | 0.50 | and | 1.00 | in | 1 | sample. |
| " | 1.00 | " | 1.50 | " | 1 | " |
| " | 1.50 | " | 2.00 | " | 1 | " |
| " | 2.00 | " | 2.50 | " | 5 | " |
| " | 2.50 | " | 3.00 | " | 3 | " |

—Am. Drug., 1891, 347.

——— Frank J. Peck estimated samples of tinctures both gravimetrically by Dunstan and Short's method and volumetrically with Mayer's reagent, the results varying from 0.146 to 0.413 per cent., the generally adopted strength being 0.315 per cent.—Am. Drug., 1891, 328.

*Tincture of Opium—Assay.*—A fluid ounce is evaporated to a small bulk, allowed to cool, filtered into a separating funnel, ten drops of ammonia added, and the separated alkaloids shaken out with two successive 40 c.c. of a mixture of equal volumes of chloroform and acetic ether. Evaporation and weighing of the residue.—Pharm. Journ. Trans., Oct. 1890, 339.

——— In thirty samples of the tincture B. F. Davenport found

| | | | | | | |
|---|---|---|---|---|---|---|
| Between | 0.80 | and | 0.90 | in | 5 | samples. |
| " | 0.90 | " | 1.00 | " | 5 | " |
| " | 1.00 | " | 1.10 | " | 3 | " |
| " | 1.10 | " | 1.20 | " | 10 | " |
| " | 1.20 | " | 1.30 | " | 7 | " |

—Am. Drug., 1891, 347.

——— *Preparation.*—O. Oldberg proposes to exhaust the opium with warm water, used in two portions, and then to add the alcohol to the aqueous solution. He claims that water readily exhausts opium of all its really useful constituents, leaving most of the nauseous and odorous principles. The proportions of water and alcohol are best altered to 9 parts of the former and 1 part of the latter.—Pharm. Record, 1892, xiii., 190, from Apothecary, Feb. 1892, 14.

——— E. E. Williams proposes to mix the powdered opium with an equal quantity of coarsely powdered pumice stone, and to shake with the warm water. A smooth mixture is quickly obtained, and it percolates readily.—Pharm. Record, 1891, 434.

——— *From the Extract.*—Hoseason has suggested that this tincture be made from the extract, and Attfield proposes the following alternate formula in his Report on the Revision of the British Pharmacopœia:

| | |
|---|---|
| Extract of opium | ¾ av. oz. |
| Distilled water | 6 fl. oz. |
| Rectified spirit (Ph. Br.) | 10 fl. oz. |
| Proof spirit | sufficient. |

Mix the extract with water, add the rectified spirit, set aside for twelve hours, filter, and add sufficient proof spirit to make 20 fl. oz.—Chem. and Drug., Aug. 1891, 245.

*Tincture of Sanguinaria—Deposit.*—F. Krauss examined the deposit which always forms on the sides of the containers. It is readily removed with soda or potassa, which dissolve part of it, the remainder forming an insoluble powder; ammonia has but little effect upon it. After washing the insoluble residue with water, followed by (HCl) acidulated water, and finally with water, it presented a reddish-black, somewhat glistening, resinous powder, which was only slightly soluble in alcohol and ether, but more so in chloroform. It is insoluble in benzin and in hydrochloric acid, but completely soluble in concentrated sulphuric acid, from which water precipitates it as a flocculent red mass. (See also Proceedings 1881, xxix., 204, and 1885, xxxiii., 94).—Am. Journ. Pharm., 1891, 473.

*Tincture of Stramonium Seed.*—E. H. Farr and R. Wright in estimating the alkaloids, found that the method of extraction by means of chloroform was thoroughly reliable, notwithstanding the presence of fixed oil in the tincture, and that the preliminary extraction of the oil with petroleum ether was unnecessary. The process followed was the same as detailed under *Tinctures*; with some kinds of stramonium seeds they experienced a great deal of trouble in avoiding emulsionizing of the chloroform layer, and they finally resorted to the following modification: The chloroform magma is introduced into a separating funnel and shaken vigorously, when, as a rule, about half the chloroform separates out and can be run off. To the remaining emulsion 5 c.c. of 90 per cent. alcohol is added and the whole well shaken and then allowed to stand, when a perfect separation into two layers takes place, the lower consisting of chloroform and alcohol and the upper of a brown alkaline aqueous liquid. The whole of the alkaloid is taken out by the chloroform, which is drawn off and added to the first portion, when the alkaloid is shaken out with three portions of acidulated water. The acid solutions are mixed, made alkaline, and the alkaloid recovered by means of chloroform. This pro-

cess is once repeated, and the final chloroformic solution, after being shaken with ammoniated water, is drawn off, and evaporated; the residue is dried at 109° C., and weighed.

In their investigation as to the best menstruum, the authors arrived at the following results, being the average of 11 samples:

| Menstruum. | Alkaloid in gm. from 100 c.c. of the tincture. | Extractive in gm. |
|---|---|---|
| 80 p. c. | .0235 | 1.02 |
| 70 p. c. | .0258 | .90 |
| 60 p. c. | .0256 | .77 |
| 50 p. c. | .0234 | .67 |
| 40 p. c. | .0209 | .64 |

The results of the proper process for making the tincture:

| Process. | Alkaloid p. c. | Extractive p. c. |
|---|---|---|
| Maceration | .019-.024 | .48- .84 |
| Double maceration | .020-.025 | .52-1.02 |
| Maceration and percolation (Ph. Br. process | .021-.027 | .54- .82 |
| Continuous percolation (U. S. Ph. process | .022-.027 | .46- 1.00 |

They recommend, therefore, a 60 to 70 per cent. alcohol as the best menstruum, and either the Ph. Br. or the U. S. Ph. process as the best process.

The results obtained by A. B. Lyons (Manual of Practical Assaying), showing about the same alkaloidal strength in the seeds and the leaves, coupled with the fact that the tincture of the seeds almost invariably becomes turbid, and deposits when kept, induced the authors to examine the leaves in the same way, both as to best menstruum and process, with the following results, being the average of three samples:

| Menstruum. | Alkaloid in gm. from 100 c.c. of the tincture. | Extractive in gm. |
|---|---|---|
| 80 p. c. | .0195 | 1.85 |
| 70 p. c. | .0215 | 2.20 |
| 60 p. c. | .0215 | 2.52 |
| 50 p. c. | .0215 | 2.73 |
| 40 p. c. | .0210 | 2.75 |

Hence they recommend, by preference, a tincture of the leaves made

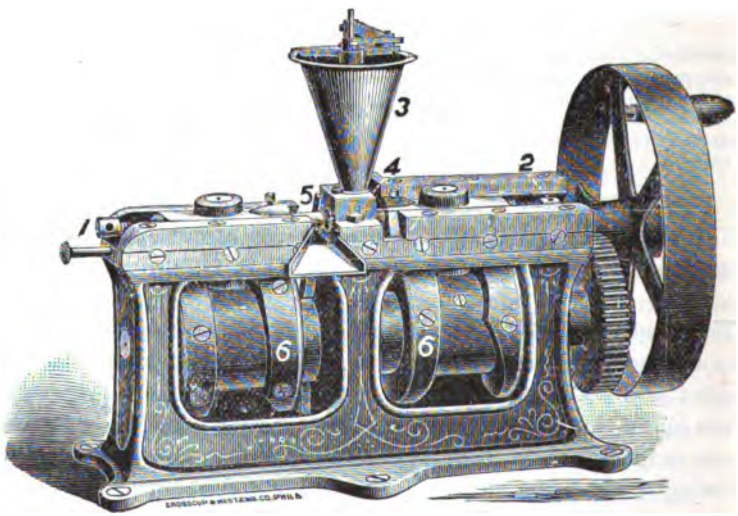
with a 50 per cent. alcohol, as being more elegant than a tincture of the seeds.—Pharm. Jour. Trans., Jan. 1892, 569–573.

*Homœopathic Tinctures—Strength.*—According to an article on homœopathy, which appeared in the New England Medical Gazette, the unit of the tinctures has of late been decided to be the *dry* crude drug; this must, however, not be understood to mean that the tinctures have to be made from the dry drug—they are all made from the fresh green drug, the plant moisture to be regarded as part of the menstruum. Being made of the uniform strength of 10 per cent., they will also be the first decimal attenuation.—Am. Drug., 1891, 330.

TROCHISCI, ETC.

*Tablet Machine.*—J. R. Witzel has devised a tablet machine, which, it is claimed, is more perfect than any yet brought out. The frame is one solid casting; the hand machine weighs about 125 pounds, occupies a counter space of 10x17 inches, and stands 9½ inches high; power ma-

FIG. 12.




Tablet Machine.

chines have an additional stand to give clearance for the large fly-wheel. The capacity is from 55 to 95 tablets per minute, and is increased in proportion to the number of plungers in operation. The pressure can be regulated to any desired degree, is direct, and comes to bear between the cams which impart the desired motions to the sliding blocks.

Ample provision is made for taking up lost motion from wear of moving parts. The dies and moulds can be easily changed from one size to another, and the regulations being few and simple, they are readily under-

stood and easily manipulated. The working parts being inclosed, accumulation of dust is prevented, wearing of the parts is lessened, and foreign matters are not rubbed into the mould for compression; hence the tablets are kept clean and unobjectionable for hypodermic medication.

Tablets are formed by the following motions: When the plungers are below the hopper, they receive the proper amount of material, which is conveyed under cover into the mould; one plunger is held stationary, while the other advances and compresses the material into the shape desired; then both dies recede, thus loosening the tablet in the mould and bringing it to the end of the mould, where it is ejected by the wiper.—Am. Journ. Pharm., 1891, 575.

*Lozenges—Medicated.*—F. Davis draws attention to the easily verified fact that the medicated lozenges turned out by large manufacturing firms vary not inconsiderably in the weight of each lozenge, and, what is of more importance, also in the quantity of active ingredient contained in each lozenge. He therefore suggests that pharmacists make their own lozenges, or that lozenges be omitted altogether from the Pharmacopœia, or that the exact weight of each lozenge be stated.—Chem. Drug., Aug. 1891, 295.

*Hydrastin Troches—R. Good.*

| | |
|---|---|
| Eucalyptol | 30 minims. |
| Hydrastin | 30 grains. |
| Cocaine hydrochlorate | 5 grains. |
| Sugar | 1 oz. av. |
| Powdered extract of licorice | 2 ozs. av. |
| Powdered tragacanth | 200 grains. |

Syrup of tolu sufficient to make a mass, which form into 100 troches.—Pharm. Record, 1892, xiii., 122.

*Trochisci Magnesiæ cum Creta.*—Attfield proposes the introduction of the following antacid lozenges into the British Pharmacopœia:

| | |
|---|---|
| Precipitated carbonate of calcium | 2,520 grains. |
| Carbonate of magnesium | 1,800 grains. |
| Chloride of sodium in powder | 720 grains. |
| Refined sugar, in powder | 29 av. oz. |
| Gum acacia, in powder | 1 av. oz. |
| Mucilage of gum acacia | 2 fl. oz. |
| Rose water, sufficient. | |

Mix the powders, and add the mucilage and rose water to form a proper mass, which is to be divided into 720 lozenges. Dry in a hot air chamber at a moderate temperature. Each lozenge contains 3½ grains of carbonate of calcium and 2½ grains of magnesium carbonate.—Chem. and Drug., Aug. 1891, 245.

*Soda-Mint Tablets.*—F. W. Haussmann recommends to substitute men-

thol for the oil of peppermint; this would prevent the brown discoloration of the tablets.—Am. Journ. Pharm., 1892, 188.

*Peppermint Lozenges.*—The flavor is improved by shaking the plain sugar lozenges with a solution of the oil of peppermint in pine-apple essence instead of in alcohol.—Pharm. Post, 1891, 987.

*Migraine Pastilles (Schlutius).*—

| | |
|---|---|
| Phenacetin | 30 cgm. |
| Caffeine-sodium salicylate | 15 mgm. |
| Quinine hydrochlorate | 20 cgm. |
| Morphine hydrochlorate | 5 mgm. |
| Saccharin | 1 mgm. |

Make into pastilles with chocolate.—Pharm. Record, 1891, xii., 262.

*Rennet Pastilles.*—A mixture of 10 parts of tartaric acid, 15 of potassium bitartrate and 50 of milk-sugar is made into troches weighing about 30 grains each. One troche will curd about one pint of milk at 60° C.—Pharm. Post, 1891, 987.

UNGUENTA.

*Ointments—Use and Preparation.*—Dr. L. D. Bulkley has published a practical and suggestive article on the above subject, of especial value to physicians, which does not admit of abstraction. He enjoins the practitioner to frequently inspect the ointments, and to test them by the odor, feeling, rubbing on the skin, etc. For particulars, the reader is referred to Am. Drug., 1891, 318, from Therapeutic Gazette.

*Pastes and Ointments.*—Among the remedies prescribed by Dr. Lassar, the following are quite frequently used: *Pasta salicylica* ("white paste"): Salicylic acid 2.0, zinc oxide, starch, of each 24.0, yellow vaselin 50.0. *Unguentum rubrum sulfur.* ("red ointment"): Mercuric sulphide 1.0, sublimed sulphur 25.0, yellow vaselin 74.0, oil of bergamot gtt. xxx. *Unguentum contra Perniones* ("frost ointment"): Carbolic acid 2.0, lead ointment, lanolin, of each 40.0, olive oil, 20.0, oil of lavender gtt. xxv. *Unguentum Diachylon carbolisatum* ("lead ointment"): Lead plaster, yellow vaselin, of each 50.0, carbolic acid 2.0. *Pasta oleosa zinci* ("zinc oil"): Zinc oxide 60.0, olive oil 40.0. *Linimentum picis* ("tar"): Beechwood tar, birchwood tar, of each 40.0, olive oil, dilute alcohol, of each 10.0; this preparation can be diluted with oil. *Pasta Naphtholi* ("scale paste"): $\beta$-Naphthol 10.0, precipitated sulphur 50.0, yellow vaselin, green soap, of each 20.0. *Pasta Resorcini mitis* ("mild resorcin paste"): Resorcin 10.0, zinc oxide, starch, of each 25.0, paraffin oil 40.0. *Pasta Resorcini fortior* ("stronger resorcin paste"): Resorcin, zinc oxide, starch, of each 20.0, paraffin oil 40.0.—Am. Journ. Pharm. 1892, 189, from Apoth. Zeitg., 1892, 105.

*Pasta Cerata.*—C. L. Schleich has succeeded in converting bees-wax into a cream-like substance which mixes readily with water, and also with

vaselin. It keeps well in closed containers, dries on exposure to the air, does not decompose or become rancid, and is non-irritating.—Zeits. Oesterr. Apoth.-Ver., 1891, 698, from Deutsch. Med.-Zeitg.

——— Andree communicates the following process for making a paste closely resembling the original one of Schleich. Melt bees-wax on a steam-bath, and emulsify with water, using as little carbonate of potassium as possible. After allowing it to cool and settle, the finely divided wax is transferred to a filter, and well washed out. A small quantity of carbolic acid water (or corrosive sublimate solution) will serve to make it keep. It forms a pasty mass, which can be applied with a brush, and, of course, is easily washed off.—Deutsch-Amerikan. Ap.-Zeitg., Jan. 1892, 143; from Apoth.-Zeitg.

——— R. Tittelbach and E. Kiegel recommend also to imitate it by saponifying the wax partially with potassium carbonate. Schleich himself, however, denies that he uses any alkali whatever.—Pharm. Zeitg., 1892, 114, 128, 131.

*Lead Paste.*—According to Hebra, 50 parts of litharge are boiled with 80 parts of vinegar to the consistence of a paste, and then mixed with 10 parts of linseed oil.—Schweiz. Woch., 1892, 8.

*Ceratum in Intermittent Fever.*—According to the *Lancet*, intermittent fever is stated to have been cured with inunctions of simple cerate along the spine.—D.-A. Apoth. Zeitg., July 1891, 67.

*Unguentum Boroglycerini.*—George M. Beringer uses the following:

| | |
|---|---|
| Solution of boroglyceride (50 per cent., in glycerin) | 25 parts. |
| Petrolatum | 75 parts. |
| Oil of rose or geranium q. s. Mix. | |

—Am. Jour. Pharm., 1892, 6.

*Unguentum Diachylon.*—According to Dieterich the addition of about 5 per cent. of water gives a much more tractable ointment than by strictly following the officinal formula.—Pharm. Centralh., 1891, 615.

——— It is again recommended to make it directly from the ingredients, and not from lead plaster. Boil together 1 part of litharge with 4 parts of olive oil in the presence of water, exactly as lead plaster, wash out the glycerin and evaporate the incorporated water, stirring until cold. The ointment obtained in this way will keep unaltered for many weeks.—Apoth. Zeitg., 1891, 357.

*Unguentum Hydrargyri Oleati.*—B. Ph. C.

| | |
|---|---|
| Oleate of mercury | 1 oz. |
| Simple ointment | 1 oz. |
| Mix without heat. | |

—Pharm. Jour. and Trans., July 25, 1891, 70.

*Unguentum Hydrargyri Nitratis.*—J. Lothian suggests to replace the lard by a mixture of equal parts of white vaseline and lanolin.—Year-book Pharm., 1891, 263; from Pharm. Jour. Trans., xxi., 872.

[A very questionable improvement.—REPORTER.]

*Unguentum Hydrargyri—Valuation.*—Harry L. Bird estimated the mercury according to the methods of Dechan and Maben and of Harold Senier (see Proceedings, 1885, xxxiii., 249), both of which gave accurate results. The author recommends the following method, as being easy of execution and reliable, which is a slight modification of Thein's method (see Proceedings, 1882, xxx., 63). Make a saturated solution of nitrate of soda or sulphate of magnesia, and boil the ointment with this solution in a medium-sized test tube till the mercury has all settled to the bottom of the tube and the fat has risen to the top. Place a small splinter of wood in the fatty layer and allow to cool; when the fat has hardened, warm the tube slightly with the hand and over a gas flame till the mass becomes loosened, when it may be removed by means of the splinter. Decant the supernatant liquid, and wash the mercury with water, boil with a little strong hydrochloric acid to form the mercury into a globule, then wash again, dry and weigh.

Fifteen samples obtained from retail stores were analyzed with the following results. The percentage given is for metallic mercury.

| | | | | | |
|---|---|---|---|---|---|
| No. 1. | 45.00 per cent. | No. 6. | 47.22 per cent. | No. 11. | 40.60 per cent. |
| " 2. | 47.62 " | " 7. | 43.90 " | " 12. | 34.90 " |
| " 3. | 42.18 " | " 8. | 30.90 " | " 13. | 39.46 " |
| " 4. | 46.50 " | " 9. | 45.16 " | " 14. | 12.00 " |
| " 5. | 13.18 " | " 10. | 48.10 " | " 15. | 43.00 " |

Only 3 of the samples contained traces of oxide. Samples known to be over three years old did not contain a trace of oxide, from which Mr. Bird infers that if oxides are present in mercurial ointments it must be due to the method of manufacture rather than to the age of the ointment.

It will be observed that all of the samples analyzed are below the Pharmacopœial standard.—Am. Drug., 1891, 328.

——— *Rapid Preparation.*—The long list of "improved" processes for this ointment has been increased by H. Borntraeger, who makes a solution of 2 gm. of mercuric chloride in 20 gm. of water, one-half of which he incorporates in 12 kilos of the lard (or ointment body), then adds the mercury gradually, and finally the remaining half of the solution. The ointment will be properly made in one hour.—Pharm. Post, 1892, 137, from Pharm. Centralh.

——— In order to facilitate the extinction of the mercury, it has been recommended lately to use lanolin. While lanolin really is a good addition for this purpose, it is not advisable to use it, because mercurial ointment containing it is apt to act violently.—Pharm. Post, 1892, 339.

——— *Volatility of the Mercury*—Kunkel passed warm air through a flat box, the bottom of which was covered with a layer of mercurial ointment, and then through long absorption tubes containing glass wool, which had been impregnated with concentrated nitric acid. He found in this way that one cubic meter air contained from 10 to 18 mgm. of mercury.—Pharm. Zeitg., 1892, 129.

*Lanolin Ointment.*—Th. J. Keenan credits the following to Helbing; it differs somewhat from that given in the volume for 1890, xxxviii., 382: Lanolin, 66; petrolatum, 6; ceresin, 1; water, 65 parts. M. Paschkis considers this ointment an ideal cold cream.—Pharm. Record, 1892, xiii., 124.

*Unguentum Zinci.*—Several manufacturing pharmacists have introduced oxide of zinc ground in benzoated oil, to facilitate the preparation of the ointment. G. Hell proposes to make a smooth ointment body with the oxide and vaselin, which has some advantages over the zinc in oil.—Pharm. Post, 1891, 1012.

*Ointment for Acne (Blackheads and Pimples.)*—

| | |
|---|---|
| Oxide of zinc, | |
| Resorcin, | |
| Starch | ana 1 dr. |
| Vaselin | 1½ drs. |

Mix.

—Am. Drug., Aug. 1891, 254.

*Ointment for Hæmorrhoids.*—

| | |
|---|---|
| Hydrochlorate of cocaine | gr. xvi. |
| Sulphate of morphine | gr. v. |
| Sulphate of atropine | gr. iv. |
| Powdered tannin | gr. xvi. |
| Petrolatum | ℥ i. |
| Essence of rose | q. s. |

Make an ointment and apply to the affected parts after each movement from the bowels. It is necessary that the discharges be of soft consistence. —*Jour. Amer. Med. Assoc.* [It appears to us that the proportion of atropine is too large to be safe.—ED. AMERICAN DRUGGIST.]—Am. Drug., Aug. 1891, 234.

For the treatment of external and internal hemorrhoids Kassobudski recommends: (1) For internal hemorrhoids: chrysarobin 1 gm., iodoform 30 cg., extr. belladonna 50 cg., cacao butter 20 gm.; to be made into six suppositories. One suppository to be used a day. (2) For external hemorrhoids: a lotion of corrosive sublimate (1 : 1,000) or phenol (1 : 50) is used several times a day, succeeding which chrysarobin salve is applied, made of the same ingredients as the above suppositories, except that cacao butter is replaced by vaselin 30 gm.—Am. Journ. Pharm., 1891, 594; from Revue Therap.

*Mayer's Ointment.*—According to J. U. Lloyd, this ointment, which enjoys quite a reputation in the southern States, is prepared as follows: Olive oil, 2½ pounds; white turpentine, ½ pound; yellow wax, 4 ozs; butter, free from salt, 4 ozs. These are melted together and heated nearly to boiling. Then add gradually red lead, 1 pound, and stir constantly until the mixture becomes black or dark brown, when it is removed from the fire, and, after cooling down a little, add honey, 12 ozs. and powdered camphor, 8 ozs. [As will be seen this is a modification of the well-known "mother salve."] —New Idea, 1891, 218; from Pharm. Era.

*Ointment for Sore Nipples.*—A mixture of equal parts of bismuth nitrate and castor oil is highly recommended by Hirsch.—Pharm. Post, 1891, 987; from Pharm. Centralh.

*Phosphorescent Ointment.*—Wellen discovered that an ointment made with 1 part of crystallized boric acid and 4 parts of vaseline became luminous in the dark, especially on stirring it vigorously with a spatula. This luminosity is similar to that often noticed on powdering rock-candy. The cause is not apparent.—Schweiz. Wochenschr., 1892, 148.

*Strawberry Cold Cream.*—20 gm. lanolin and 40 gm. best white vaselin are triturated in a mortar, 30 gm. clarified strawberry juice mixed with it, and finally added 0.05 gm. of vanillin and 10 drops strawberry ether. The juice must be added in small quantities at a time.—S. Torjesen.—Zeits. Oesterr. Apoth.-Ver., July 1891, 346.

*Epidermine.*—According to Zeits. Oesterr. Apoth.-Ver., 1892, 271, 293, "epidermine" is prepared by fusing 15 gm. of white wax, and triturating it in a hot mortar with 15 gm. of powdered gum arabic until a homogeneous mass is obtained, to which is added a boiling mixture of 15 gm. of water and 15 gm. of glycerin, and stir until cold. Any further addition of medicinal ingredients are to be previously triturated with a little glycerin, but not with water, if necessary.

*Pomatum—For Counter Sale.*

| | | |
|---|---|---|
| I. | Lard | 16 ozs. |
| | Oil of bergamot | 2 drs. |
| | Oil of rose geranium | 15 minims. |
| | Oil of lemon grass | 15 minims. |

Mix.

| | | |
|---|---|---|
| II. | Lard | 16 ozs. |
| | Oil of bergamot | ½ oz. |
| | Oil of cassia | 30 minims. |
| | Oil of bitter almond | 10 minims. |

Mix.

—Drug. Circ., 1892, 64.

*Lanolin Pomatum.*—A good "base" for pomatum is the following: 38

parts of lard, 2 of white wax, 30 of benzoinated olive oil and 30 of lanolin.—Pharm. Post, 1891, 986.

*Resinated Castor Oil Pomatum.*—Melt together: 100 parts of light-colored rosin, 100 of white wax, 50 of mutton suet and 200 of castor oil; color and perfume to suit. This pomatum keeps the hair well in place, and can easily be removed with an alcoholic alkaline solution.—Pharm. Centralhalle, 1891, 491, from Seifenfabrikant.

*Vaselin Pomatum.*—The following perfume is recommended: Oils of rose, 8 drops; bergamot, 12 drops; cinnamon, 2 drops; and cloves, 2 drops. This quantity will suffice for one pound of vaseline.—Chem. Drug., April 1892, 572.

*Rose Pomatum—German.*—Schimmel & Co. prepare their rose pomatum from German-grown roses after an improved method. The petals are digested at a very gentle heat with the fat, with continuous stirring; after a certain time the mass is transferred to a centrifugal machine, which quickly separates the fat from the petals. The fat is automatically transferred back to the digester, and treated with a fresh batch of petals, and so on, until sufficiently impregnated. During the whole process nothing comes in contact with the pomatum except parts of the apparatus.—Pharm. Centralh., 1891, 624.

*Absorption of Drugs, Incorporated in Fatty Substances.*—L. Guignard has carried out some interesting experiments to ascertain: (1) If lard, vaselin and lanolin are absorbed by the unbroken skin; (2) Whether there exist any difference in the rate of absorption. He arrived at some unexpected results: Neither potassium iodide nor mercury, morphine, strychnine, or atropine are absorbed by the unbroken skin; lanolin is not of more value for this purpose than vaselin or lard.—Am. Journ. Med. Sci., 1891, cii., 646, from Lyon Médicale.

## VINA.

*Vinum Aurantii Detannatum.—B. Ph. C.*

| | |
|---|---|
| Orange wine | 1 gal. (imp.) |
| Gelatin, cut small | 2 oz. |

Macerate for fourteen days and decant.

—Pharm. Jour. and Trans., July 25, 1891, 70.

*Vinum Xericum Detannatum.—B. Ph. C.*

| | |
|---|---|
| Sherry | 1 gal. (imp.) |
| Gelatin, cut small | 2 oz. |

Macerate for fourteen days and decant.

—Pharm. Jour. and Trans., July 25, 1891, 70.

*Coca Wine.*—R. Good's formula is:

| | |
|---|---|
| Fluid extract of coca | 2 fl. ozs. |
| Fuller's earth | ½ ounce. |

Mix, then add

| | |
|---|---|
| Claret wine | 24 fl. ozs. |
| Port wine | 4 fl. ozs. |
| Syrup | 3 fl. ozs. |

Mix and filter.

- Pharm. Record, 1892, xiii., 122.

*Wine of Pepsin.—F. J. Wulling.*

| | |
|---|---|
| Pepsin in scales | 128 grains. |
| Glycerin | 1 fl. oz. |
| Water | 1 fl. oz. |
| Dilute hydrochloric acid | 75 minims. |
| Stronger white wine to make | 16 fl. ozs.—M. |

—Pharm. Record, 1892, xiii., 43.

*Wine of Pepsin.*—James Clark proposes the following formula as being more satisfactory than any other he has tried.

| | |
|---|---|
| Pepsin, soluble scales | 320 grains. |
| Distilled water | 3 troy ounces. |
| Glycerin | 2 troy ounces. |
| Strong hydrochloric acid | 2 drachms. |
| Sherry wine, detannated (B. P. C.) sufficient to make 20 fluid ounces. | |

Dissolve the pepsin in the mixed acid and water, then add the glycerin, and finally the wine. Allow to stand for three days, and filter. Three minims of this wine should completely digest 100 grains of coagulated white of egg in 1 ounce of water, acidulated with 5 minims of hydrochloric acid, in less than thirty minutes at 130° F. (about 55° C.).—Pharm. Journ. Trans., Jan. 1892, 597.

### MISCELLANEOUS.

*Antiseptics.*—Rothenstein and Bourcart give the following *résumé* of their studies of antiseptics:

(1) *Disinfectants* are substances which render innocuous the hurtful decomposition products of microbes. They act by the evolution of nascent oxygen, and the quicker and the more powerful, the larger the quantity of oxygen evolved.

(2) *Non-bactericide Antiseptics* are substances which render sterile the nutrient medium. This can be effected by cold (with freezing mixtures, liquid carbonic acid, etc.), or by desiccation (potassium nitrate, alum, borax).

(3) *Bactericides* are substances which will kill the bacteria directly. Such are the inorganic salts of mercury, lead and bismuth, but chiefly organic substances. Assuming equal solubility and permeability, these latter act the more energetically, the more oxygen they contain (or oxygen substituted by methyl, ethyl, benzol and naphthalin). The following groups

increase the activity: CO, COH, COOH, OH, NO, $NO_2$; whilst N, $NH_2$, and NH decrease it. Rosaniline, because of its three amido-groups, ranks low as a bactericide; the methylated (phenylated) derivatives act much better, especially methyl-violet and auramin R. (Stilling's blue and yellow pyoktanin).—Pharm. Post, 1891, 1010, from Monatsh. f. Dermatol.

*Sterilization of Instruments.*—According to Dr. A. G. Gerster, surgical instruments can be completely sterilized by Davidson's method of boiling for five minutes in water, containing one heaped tablespoonful of washing soda to the quart.—Am. Journ. Med. Sci., 1891, cii., 499.

*Catgut—Sterilized.*—In a test-tube are put 8 to 10 drops of oil of juniper berries, which are then absorbed by introducing a little absorbent cotton; upon the cotton is placed the catgut in spiral form, and the test-tube closed as tightly as possible with a plug of absorbent cotton; by placing the test-tube (in a horizontal position) in a sterilizing oven for half an hour, at 150° C., the catgut is effectively sterilized without loss of flexibility or firmness.—Koch, Am. Journ. Pharm., July 1891, 347, from Pharm. Ztg., 1891, 360.

*Sterilized Catgut, Silk, etc.*—Ferd. Lascar has written at length on this subject, from which article the following directions are taken:

*Silk.*—Braided surgeons' silk, after the threads which hold the skeins together have been cut, is immersed for six hours in wax containing 6 per cent. of carbolic and 6 per cent. of salicylic acid. The wax is kept at a temperature high enough to liquefy it. The silk is then drawn carefully through soft carbolized sponges and reeled on glass or rubber spools. These spools must previously be immersed in a five per cent. solution of carbolic acid in alcohol. This solution is also employed to sterilize the glass jars destined to hold them. These glass jars are generally supplied with perforated rubber stoppers, the perforation being hermetically closed by a glass stopper, the end of the silk being held firmly between the rubber and the glass stopper. The alcoholic carbolic solution is used to properly sterilize the rubber and stopper.

In preparing such silk for use care must be taken to remove from it any superfluous adhering wax. This is best done by holding the carbolized sponge in the left hand and firmly pressing the same while the silk taken from the molten wax is quickly drawn through the sponge, which is required to be absolutely free from all particles of sand and dust. In reeling the silk on the spools care must be taken that no dust gets on the silk, and for this reason it is well to reel every skein as soon as finished, and to have at hand a sheet of white wrapping paper properly sterilized, upon which to lay the silk.

The best way to sterilize such paper is to immerse the same in a 1 to 2,000 solution of bichloride of mercury for about twenty minutes, and then dry at a moderate heat. The hands of the manipulator ought also be washed in such a solution.

*Catgut* prepared according to the following formula is claimed to resist absorption from twenty to sixty days: Take of chromic acid 1 part, water 5 parts; to one part of this solution add 20 parts of glycerin. Keep the gut immersed seven or eight minutes, and then preserve in glycerin containing 10 per cent. of carbolic acid.

In Wharton's "Minor Surgery" is found the following direction: First, wash the gut in alcohol, then place it in a 5 per cent. aqueous carbolic acid solution containing 30 grains of bichromate of potassium to the quart. The gut is immersed in this preparation for forty-eight hours; for the larger sizes of gut somewhat longer. Such prepared gut should be kept in alcohol and resist absorption for a week or more.

The chromic salt is here, as in other formulas, intended to harden the gut, and thereby prevent it from being absorbed too readily. There are instances where catgut of more than ordinary thickness is required, but in preparing it by the chromic process it frequently happens that it becomes very stiff and unwieldly. An addition of ten per cent. of glycerin to the chromic solution generally prevents this.

In preparing such solutions the rule is to rely on carbolic acid as the agent for sterilization.

Another method is to soak the gut in alcohol for a short time, then in a chromic acid solution prepared according to the following formula:

| | | |
|---|---|---|
| Chromic acid | 1 | gr. |
| Carbolic acid | 200 | grs. |
| Alcohol | 2 | drs. |
| Water | 2½ | ozs. |

It is left in this solution for forty-eight hours and then placed in glass jars for use. Before using it is placed in a carbolic acid solution.—Drug. Circ., 1891, 267.

*Radlauer's Antiseptic.*—This secret remedy, called by Radlauer "Zincum boro-thymolicum jodatum," has been analyzed by F. Goldmann, and found to be in the main true to the scientific name given to it, but not a chemical compound, merely a mechanical mixture. The composition is 85 parts of zinc sulphate, 2.5 of zinc iodide, 2.5 of thymol, and 10 of boric acid.—Pharm. Zeitg., 1891, 494; Am. Jour. of Pharm., 1891, 483.

*Antisudorine.*—This proprietary compound is a solution of 9 parts of chromic acid in 100 parts of water; it is recommended in foot-sweat; presumably to be diluted with water for a foot-bath.—Apoth. Zeitg., 1892, 19.

*Blacking.*—To an intimate mixture of 600 parts each, of bone-black, dextrin and boiling water, is slowly added 120 parts of fuming sulphuric acid, and finally 36 parts of oleic acid and 36 parts of spermaceti.—Pharm. Post, 1891, 812.

*Blacking—Analysis.*—J. Pinette recommends the following method as quick and reliable. 5 gm. of the blacking are reduced with about 100 cc.

of water, and well shaken with a mixture of equal parts of ether and petroleum ether. After separation an aliquot part of the ethereal layer is evaporated to dryness; this gives the fat. An aliquot part of the aqueous layer is filtered and titrated with decinormal soda (with phenolphthalein); this gives the free acid. The neutral solution is evaporated to dryness, weighed, incinerated and weighed again; the difference gives the invert-sugar and extractive matter. Another aliquot part is neutralized, heated until the ethereal odor has disappeared, and the invert-sugar determined with Fehling's solution.

The difference between the amount of the invert-sugar and the previous sum gives the amount of extractive matter. Water and ash are determined from other portions of the blacking, and the carbonaceous matter from the difference of all other substances.—Chem. Zeitg., xv., 917.

*Dressing for Brown-leather Boots.*—Boil yellow wax, scraped small, with pearlash, ½ oz.; yellow soap, ¼ oz.; and water 12 oz., until a perfectly uniform cream is obtained; then remove from the fire and add oil of turpentine, 8 oz.; phosphine (anilin dye) 4 grs., previously dissolved in ½ oz. spirit. Shake well, and make up to 24 oz. with water.—Chem. and Drug., July 18, 1891, 96.

*Brass—To Cut it Chemically.*—With a strong solution of bichloride of mercury, draw a line across the brass by means of a quill pen. After drying, with the same pen draw over the line with nitric acid. The brass can then be broken, as glass cut with a diamond. Pharm. Record, 1891, xii, 262.

*Catramine.*—According to Pharm. Post, 1892, 472, catramine is the volatile oil of Abies canadensis balsamica.

*Cement of Iron.*—Paint the opposed surfaces with a mixture of 6 parts of sulphur, 6 parts of white lead, and 1 part of borax, mixed with sufficient sulphuric acid; and press the pieces together. After one week, it is stated, the pieces will adhere closely, and cannot be hammered apart.—Bull. Pharm., 1891, 216.

*Cement for Glass.*—Heat powdered alum until fluid, and apply to the previously-warmed edges.—Pharm. Post, 1891, 938.

*Cement for Glass Letters, etc.*—Dissolve 1 part of india rubber and 3 parts of mastic in 50 parts of chloroform. It must be applied very rapidly, as it thickens very soon.-Am. Drug., 1891, 317, from Sci. Am.

*Cement for Porcelain.*—Freshly-precipitated casein is introduced into a bottle so as to fill the latter one-fourth; which is then filled with sodium silicate. The casein dissolves on shaking.—Am. Drug., 1891, 316, from Rundschau, Prag.

A collection of formulas for *cement* will be found in Pharm. Era, 1892, 235.

*Chapman's Internal Disinfectant.*—This proprietary preparation consists, according to the investigation of R. G. Eccles, of granulated sugar and consequently akin to "caskine" (kaskine) which F. Hoffmann found also to be sugar.—Pharm. Rundschau, N. Y., 1891, 269.

*Chewing Gums, etc.*—An exhaustive article on the different "chews" in use among the inhabitants of many countries will be found in Bull. of Pharm., 1892, 68.

*Cholera Drops.—German Unoff. Formulary.*

| | |
|---|---|
| Aromatic tincture | 40 parts. |
| Acetic ether | 9 parts. |
| Oil of peppermint | 1 part. |

Mix.

—Pharm. Post, 1891, 841.

*Clothes Cleaners.*—A collection of formulas will be found in Pharm. Era, 1892, 236.

*Corn Cure.*—A collection of formulas will be found in Pharm. Era, 1892, 205.

*Corn Cure.*—A mixture of one part each of lactic and salicylic acids in eight parts of collodion will effect the removal of warts and corns in a short time.—Am. Journ. Med. Sci., 1891, cii., 405.

*General Disinfectant.*—Dissolve 4 pounds of crude copperas or 2 pounds of blue vitriol in 4 gallons of hot water, add 2 ounces of sulphuric acid, filter while still hot, and dissolve in it 8 ounces of carbolic acid. After settling or filtration, bottle it.—Pharm. Rundschau, N. Y., 1891, 295.

*Sick Diet.*—Dr. R. W. Burnet gives directions for preparing several articles of food, suitable for the sick, for which the readers are referred to the original paper. The list comprises peptonized beef-tea; pept. gruel; pept. milk gruel; pept. milk; Irish moss; beef tea; beef essence; calf's-foot jelly; wine jelly; port-wine jelly; milk, egg and brandy; milk lemonade; milk and isinglass.—Am. Drug., 1891, 315, from Manual of Clinical Dietetics.

*Embalming Fluid—Morell's—*

| | |
|---|---|
| Arsenious acid | 14 oz. av. |
| Caustic soda | 7 oz. av. |
| Carbolic acid, sufficient, | |
| Water, enough to make | 100 oz. av. |

Dissolve the arsenious acid and the soda in 40 ounces of water by heat. Allow the solution to cool, and add just sufficient carbolic acid to render it opalescent; finally add water up to 100 ounces.—Am. Drug., 1891, 240.

*Enamel.*—A durable enamel for shelvings, etc., can be obtained by first applying to the smoothly planed surface a mixture of glue water and zinc oxide, and, after this has dried, giving a second coating, consisting of glue

water and zinc chloride. This forms a brilliant, glass-like enamel, which, of course, may be used for other purposes.—Western Druggist, 1892, 13.

*Discolored Engravings—Restoration.*—The print is fastened to a board with tacks, and washed very carefully with water, containing ammonium carbonate (1 :20); it is now rinsed thoroughly, and after drying the reverse side is treated similarly. The print is now moistened with diluted acetic acid (1 vinegar, 5 water), and then washed with a weak, filtered solution of chlorinated lime (3 : 100). Finally it is rinsed with pure water, and dried in the sun. The paper will now appear perfectly white.—Pharm. Centralhalle, 1891, 513, from Industriebl.

*Transferring Prints to Glass.*—The Am. Drug., Aug. 1891, 264, contains detailed instructions for accomplishing this purpose, which in the main consist in first moistening the print on the reverse side with water, containing from one to three per cent. of nitric acid, according to quality of paper. The next step is to press the print on to the glass, which previously has received a sticky coat of dammar varnish; after drying, the paper is rubbed off, and the "picture" varnished.

*Face Preparations.*—A collection of formulas will be found in Pharm. Era, 1892, 103, 138.

*Face Washes—Poisonous.*—B. F. Davenport has examined several face "bleaches" and found them to contain corrosive sublimate in dangerous proportions (from 3 to 8 grains to the fluid ounce); notably: Madame Rupert's face bleach, Madame Fale's excelsior complexion bleach, Soule's eradicator, Delisle's royal cream, all of which claim expressly "not to contain any hurtful ingredients."—Am. Drug., 1891, 347.

*Fly Paper—Sticky.*—Melt together 1 pound of resin, 3½ ounces of raw linseed oil, and add 3½ ounces of molasses. Spread upon paper, while warm.—Am. Drug., 1891, 337.

*Colored Fires.*—The American Druggist gives the following formulas for colored fires, in the making of which the dangerous nature of potassium chlorate must not be lost sight of.

For green fire, medium slow-burning, use 13 parts of potassium chlorate, 66 parts of barium nitrate, and 21 parts of sulphur. For a quicker fire use more potassium chlorate and less of barium nitrate, leaving the proportion of sulphur the same. Thus the most rapid green fire known contains 36 parts of potassium chlorate and only 40 parts of barium nitrate. For a slower fire reverse the proportions.

Another beautiful green fire is made by mixing

| | |
|---|---|
| Arsenic | 2 parts. |
| Charcoal | 3 " |
| Potassium chlorate | 5 " |
| Sulphur | 13 " |
| Barium nitrate | 77 " |

Mix.

The objection to this burned in the house is the arsenical fumes generated. For out-of-door work, however, especially when fired behind a reflector, the effect is superb.

This objection holds in regard to blue fires, nearly all of which contain arsenic. The following make the most beautiful blue lights:

I.

| | |
|---|---|
| Realgar | 2 parts. |
| Charcoal | 3 " |
| Chlorate of potassium | 5 " |
| Sulphur | 13 " |
| Calcium nitrate | 77 " |

II.

| | |
|---|---|
| Orpiment | 1 part. |
| Charcoal | 1 " |
| Black sulphuret of antimony | 16 " |
| Potassium nitrate | 48 " |
| Sulphur | 64 " |

A blue which can be used in a theatre or large hall, and will produce fine stage effects, though not so brilliant as the foregoing, is as follows:

| | |
|---|---|
| Sulphur | 15 parts. |
| Potassium sulphate | 15 " |
| Ammonio-sulphate of copper | 15 " |
| Potassium nitrate | 27 " |
| Potassium chlorate | 28 " |

Mix.

A very brilliant violet-blue fire, medium slow-burning, has the following formula:

| | |
|---|---|
| Potassium chlorate | 51 parts. |
| Calcium carbonate | 18 " |
| Powdered malachite | 16 " |
| Sulphur | 15 " |

Mix.

For a deep crimson red, take

| | |
|---|---|
| Potassium chlorate | 17 parts. |
| Charcoal | 23 " |
| Sulphur | 90 " |
| Strontium nitrate | 270 " |

A good red for in-door use is composed as follows:

| | |
|---|---|
| Strontium nitrate | 8 parts. |
| Sugar | 4 " |
| Potassium chlorate | 1 part. |

—Am. Drug., 1891, 336.

——— A tabulated collection of formulas will be found in Pharm. Era, 1892, 387.

*Freckles—Ointment.*—1 part of white precipitate, 1 of bismuth nitrate, and 30 of glycerite of starch; to be rubbed well in every two days. *Solution.*—1 part of zinc sulphocarbolate, 20 of glycerin, 10 of alcohol and 70 of rosewater; to be used as a wash morning and night. *Liniment.*—3 parts of zinc oxide, ½ of bismuth subiodide, 2½ of dextrin and 3 of glycerin; the face to be anointed at night, and to be washed off in the morning.—Pharm. Centralhalle, 1891, 462.

*Russian Furniture Polish.*—Dissolve 1,000 parts of best shellac, 65 parts of rosin, and 200 parts of Venice turpentine in 2,600 parts of alcohol. After standing for three or four weeks in a warm place decant carefully, and filter. Apply like French polish.—National Drug.

*Fabrics, etc., Rendered Fire-proof.*—

1. *For Light Fabrics.*

| | | |
|---|---|---|
| Ammonium sulphate | 8 | parts. |
| Ammonium carbonate | 2.5 | " |
| Borax | 2 | " |
| Boric acid | 3 | " |
| Starch | 2 | " |
| Water | 100 | " |

Dissolve the salts, which should be pure, and particularly free from iron, in a sufficient quantity of the water. Add the starch, previously made into a jelly with boiling water, and lastly the rest of the water. Impregnate the fabric with the solution, dry it, and iron it.

In place of 2 parts of starch, 0.4 part of gelatin or 0.4 part of dextrin may be used.

A quart of the solution will be sufficient for about 16 yards.

2. *For Woodwork, Ropes, Straw Mats, Bags, etc.*

| | | |
|---|---|---|
| Ammonium chloride | 15 | parts. |
| Boric acid | 6 | " |
| Borax | 3 | " |
| Water | 100 | " |

Immerse the articles for fifteen or twenty minutes in the solution, heated to 100° C. (212° F.), press, and dry.

3. *For Paper.*

| | | |
|---|---|---|
| Ammonium sulphate | 8 | parts. |
| Boric acid | 3 | " |
| Borax | 2 | " |
| Water | 100 | " |

Heat to 50° C. (122° F.) and impregnate the paper.—Am. Drug., 1891, 337; from Polyt. Mittheilg.

*Glass—Matt-etching.*—N. S. Nilsson recommends the following method for obtaining the so-called "*white acid*" of glass etchers. A container (of lead) of sufficient size, is filled one-third full of ordinary commercial hydrofluoric acid, and about an equal weight of carbonate of ammonium is added. When effervescense has ceased, a small slip of clean glass is immersed in the mixture, and permitted to remain six to eight minutes. Upon withdrawing it is rinsed in clean water, wiped, and dried. If it appears evenly translucent over its entire surface, the mixture is all right, and may be used for regular work. If, however, it is deeply and irregularly etched, with some parts clear and some parts ground, the acid is in excess, and carbonate should be added. If only partially affected by the acid, and, while slightly ground all over, it is transparent, too great an amount of ammonia has been used, and acid must be added. The "white acid" as made in this way, is thus very easily regulated, and can easily be tested with a clean piece of glass.—Scientific American through Chem. News, July 24, 1891, 39.

*Glue and Gelatin—Drying.*—According to the patent of H. Heyne, solutions of glue, etc., are mixed with volatile substances which boil at more than 100° C., and do not act on the glue (oil of turpentine, crude benzol, etc.). The mixture is poured on hot plates, when first most of the water is evaporated, and then the volatile substance converted into vapor, carrying with it the remainder of the water. The tough mass not only is thoroughly dried, but is also converted into a porous powder.—Chem. Zeitg., 1891, 1426.

*Zinc Glue—For Stiff Surgical Dressings.*—According to Treutler, the following paste is thickly applied, and rubbed into the muslin or gauze forming the bandage:

| | |
|---|---|
| Oxide of zinc | 10 parts. |
| Gelatin | 30 parts. |
| Glycerin | 30 parts. |
| Water | 30 parts. |

If wanted, a thinner preparation may be made by altering the quantities of gelatin and water to 20 and 40 respectively.—Am. Drug., Aug. 1891, 240, from Med.-Chir. Rundschau.

*Liquid Glue.*—Mix 15 parts of recently-slaked lime with a boiling solution of 60 parts of sugar in 180 parts of water, and allow it to stand for several days in a warm place, stirring frequently. After settling, pour off the solution of saccharate of lime, and dissolve in it 60 parts of white glue, by first allowing it to swell for 24 hours, and then heating it. After settling, pour off the clear liquid.—Pharm. Rundschau, N. Y., 1891, 294.

(———) A collection of formulas will be found in Pharm. Era, 1892, 204, 234.

*Hair Dye from Walnut Peel.*—40 parts of fresh walnut peel and 5 parts of alum are digested with 200 parts of olive oil or lanolin until all moisture has been driven off; strain and perfume. The hair must always be freed from grease before applying the dye.—D. A. Apoth. Zeitg., July 1891, 67, from N. Erf. u. Erf.

*Hair Dye from Anacardic Acid.*—According to Gawalowski, the ammonium salt of anacardic acid, $C_{22}H_{32}O_{31}$ (one of the constituents of the liquid secreted under the pericarp of the cashew nut) can be used for dyeing the hair. For this purpose the hair is first moistened with an aqueous solution of the salt, and afterwards combed with a comb which has been dipped into solution of ferrous sulphate. Or the ammonium anacardate may be applied in a pomade or oil, and afterwards oleate of iron.—Zeitschr. Oester. Apoth.-Ver., 1891, 485.

*Hair Oil Perfumes—Rose.*—Oils of bergamot, 25.0, rose, 3.0, rose geranium, 2.0, cloves, 5.0. *Violet:* Oils of bergamot, 15.0, sandal, 5.0, orris (butter), 5.0, cloves, 2.0, rose, 1.0. *Orange:* Oils of bergamot, 20.0, bitter orange peel, 10.0, neroli, 2.0, rose geranium, 5.0, petitgrain, 3.0. *Vanilla:* Oils of bergamot, 10.0, cloves, 5.0. rose geranium, 5.0, and vanillin, 3.0 (to be dissolved in a little of the olive oil). *Heliotrope:* Oils of rose geranium, 10.0, cloves, 3.0, Peru balsam, 3.0, and heliotropin, 1.0 (to be dissolved in a little of the olive oil).—Pharm. Zeitg., 1891, 652, from Seifenfabr.

*Hair-Wash.*—Dr. Unna recommends the use of resorcin: Resorcin, 5 gm.; alcohol, 150 gm.; cologne, 50 gm.; castor oil, 2 gm. Mix.—Pharm. Post, July 1891, 494.

——— A collection of formulas will be found in Pharm. Era, 1892, 13, 44.

*Hair Wash.*—T. Robinson speaks highly of the following lotions for baldness:

*Alkaline lotion to be used for one week—*

| | |
|---|---|
| Borax | 1 drachm. |
| Glycerin | 2 drachms. |
| Tincture of cantharides | 6 drachms. |
| Water of ammonia | 1 oz. (av.) |
| Oil of bay | 4 drops. |
| Water, to | 6 oz. (av.) |

Mix.

*Acid lotion to be used after the alkaline—*

| | |
|---|---|
| Aromatic vinegar | 2 drachms. |
| Glycerin | 2 drachms. |
| Alcohol | 1 oz. (av.) |
| Blistering liquid, Ph. Br. | 1 drachm. |
| Orange flower water | 2 oz. (av.) |
| Rose-water, to | 6 oz. (av.) |

Mix.

The lotions must be well rubbed in with a sponge.—Chem. Drug., Aug. 1891, 343.

*Hair Wash.*—The following is a new kind of wash, which appears to be based on correct principles:

| | |
|---|---|
| Borax | 2.0 |
| Bitter almond water | 3.0 |
| Orange-flower water | 5.0 |
| Rose water | 40.0 |
| Olive oil | 50.0 |

Mix.

—Pharm. Zeitg., 1892, 123.

*Harness-dressing.*—

Pure rubber .......... 1 oz. (av.)

Dissolve in

Benzin (benzol?) .......... 18 oz. (av.)

Then add

Tallow or oil .......... 2 pounds (av.)

*Ink for Glass or Porcelain.*—A solution of 10 parts of bleached shellac and 5 parts of Venice turpentine in 15 parts oil of turpentine, to which 5 parts of lampblack has been added. The solution is hastened by immersing the containing vessel in hot water—Am. Journ. Pharm., 1892, 22, from Rundschau, Prag., 1891, 970.

*Black Ink.*—One oz. of extract of logwood is dissolved in 15 oz. of lime-water on a water-bath, then add 5 minims of carbolic acid, 30 minims of crude hydrochloric acid and 1 oz. of water, mixed together. Continue to heat, and stir for half an hour, then set aside to deposit and cool. Pour off the clear liquid, and add to it gradually with constant stirring a solution of 8 grains of yellow chromate of potassium in 2 oz. of water, next 1 oz. of mucilage, and make up to 20 fluid ounces with water. Chem. Drug., Nov. 1891, 827. A correspondent suggests to mix equal parts of this ink and a good gall-and-iron ink, which gives a blacker ink.

*Indelible Ink Without Silver Nitrate.*

| | |
|---|---|
| Toluidine | 40 parts. |
| Anilin oil | 240 parts. |

Mix, and add

| | |
|---|---|
| Hydrochloric acid | 480 parts. |
| Mucilage | 480 parts. |

The spot on which the writing is to be done must previously be moistened with the following mixture:

| | |
|---|---|
| Potassa | 2 parts. |
| Cupric sulphate | 4 parts. |
| Ammonium chloride | 2 parts. |
| Water | 144 parts. |
| Mucilage | 48 parts. |

Mix.

—Western Druggist.

*Aniline-Black Marking Ink.*—In using this ink the aniline-black is generated upon the fibre itself. R. Wright recommends to proceed as follows: The spot upon which the writing is to be done is first treated with a mordant.

| | |
|---|---|
| Potassium chlorate | 20 grains. |
| Copper sulphate | 40 grains. |
| Ammonium chloride | 20 grains. |
| Distilled water | 6 fl. dr. |
| Thick mucilage of acacia | 2 fl. dr. |

After drying, the spot is to be written upon with an aniline solution:

| | |
|---|---|
| Aniline | 1 fl. dr. |
| Solid toluidine | 10 grains. |
| Dilute hydrochloric acid | 2 fl. dr. |
| Mucilage of acacia | 2 fl. dr. |

A quill pen must be used. After several days, boil the fabric with soap lye.—Am. Drug., July 1891, 225, from Chem. and Drug.

*Ink for Rubber Stamps.*—According to Dieterich (Pharm. Manual), the following colors and liquids are the best for this purpose:

(*a*) *Liquids.*—Make a mixture of 10 parts of water, 10 of alcohol, 10 of wood vinegar, and 70 of glycerin. For every 100 parts of this liquid use the amounts of coloring matter mentioned in the succeeding list.

(*b*) *Colors.*—*Blue:* Aniline-blue 1B, 3 parts. *Violet:* Methyl violet 3B, 2 parts. *Cherry-red:* Diamond Fuchsin I, 2 parts. *Orange-red:* Eosin BBN, 3 parts; as this color does not stand acids, the wood vinegar must here be omitted. *Green:* Aniline-green D (q. s.). *Brown:* Vesuvine B, or Bismarck brown (q. s.). *Black:* Deep-black E (q. s.).

*White Ink for Black Cards.*—1 drachm of oxide of zinc is well rubbed up with 2 fluid drachms of water and about 1 fluid drachm of mucilage.—Chem. Drug., April 1892, 572.

*Ink for writing on Zinc.*—Dieterich gives the following formula:

| | |
|---|---|
| Potassium chloride | 3 parts. |
| Sulphate of copper | 6 " |
| Distilled water | 70 " |
| Dissolve and mix with— | |
| Aniline-blue (water-soluble) | $\frac{1}{20}$ " |
| Dilute acetic acid | 5 " |
| Distilled water | 20 " |

—Year-book Pharm., 1891, 294, from Chem. Drug., 1890.

*Ink—Examination.*—A. Robertson and J. Hofmann examine documents and other writings by drawing lines across them with quill pens dipped in the following reagents, when the different kinds of ink will easily be detected:

Reagents: 1. Oxalic acid (3 per cent. solution). 2. Tartaric acid (10 per cent.). 3. Chlorinated lime (2 per cent.). 4. Stannous chloride (1 part in 1 part of hydrochloric acid and 10 parts of water). 5. Sulphuric acid (15 per cent.). 6. Hydrochloric acid (10 per cent). 7. Nitric acid (20 per cent.). 8. Saturated solution of sulphurous acid. 9. Auric chloride (4 per cent.). 10. Potassium ferrocyanide (1 part in 1 part of hydrochloric acid and 10 parts of water). 11. Sodium hyposulphite (1 part in 1 part of ammonia and 10 parts of water). 12. Sodium hydroxide solution (4 per cent.).—Chem. Zeitg., Rep., 1892, 172, from Pharm. Centralh., 1892, 225.

*Inks—Examination.*—G. Schluttig and G. S. Neumann have given very detailed directions for the thorough examination of inks, for a condensation of which reference must be had to Zeits. Analyt. Chem., 1892, 116–118, or to a translation in Chem. News, 1892, lxv., 63.

*Diamond Ink for Writing on Glass.*—To a 15–20 per cent. hydrofluoric acid add sufficient mucilage of gum arabic to proper consistence, add one-eighth of its vol. of glycerin, and color with caramel. It will be necessary to allow it to dry on the glass before it is removed.—D.-A. Apoth. Zeitg., July 1891, 67; from Drog. Zeitg.

*Ivory, Artificial.*—A patent has recently been granted for a process for making artificial ivory from tribasic calcium phosphate, calcium carbonate, magnesia, alumina, gelatin and albumen.—Drug. Circ., 1891, 272.

*Keeley's "Gold Cure."*—According to Pharm. Post, this notorious swindle consists of: 12 grains of gold and sodium chloride, 6 grains of ammonium chloride, 1 grain of nitrate of strychnine, ¼ of a grain of atropine, 3 fluidounces of cinchona and 1 fluidounce each of fluid extract of coca, glycerin and water.—Pharm. Post, 1892, 150.

*Lotion for Chapped Hands.*—(1) Corn starch 2, glycerin 8, water 50, all parts by weight, and perfume q. s. (2) Menthol 90 grains, salol 120 grains, olive oil 120 grains, lanolin 12 troy ounces.—Pharm. Era, 1892, 15.

*Moth Killers—Furs.*—20 gm. pure carbolic acid, 10 gm. of oil of cloves, 10 gm. of oil of lemon, 10 gm. oil of bitter almonds, and 2½ gm. of aniline oil are dissolved in 1½ liters of alcohol.

*Clothes.*—15 gm. pure carbolic acid, 30 gm. camphor, 30 gm. oil of rosemary, 5 gm. oil of cloves, and 5 gm. aniline oil are dissolved in 2½ liters of alcohol. Use both liquids with an atomizer, and keep both furs and clothes in tight containers.

*Upholstery.*—Vapors of acetic acid are the best remedy against moths; especially if at the same time the smoke from tobacco leaves, thrown on live coals, be applied.—Zeits. Oesterr. Apoth.-Ver., 1892, 314; from Drog.-Zeitg.

*Poisons for Vermin and Insects.*—A collection of formulas will be found in Pharm. Era, 1892, 387–389.

*Mouse Poison.*—

| | |
|---|---|
| Sulphate of strychnine | 70 parts. |
| Sugar of milk | 70 " |
| Prussian blue | 2 " |
| Arsenious acid | 140 " |
| Wheat flour | 600 " |

Rub the sulphate of strychnine and sugar of milk together, add the Prussian blue and arsenic, finally the flour, and mix thoroughly.—Am. Drug., Aug. 1891, 258, from Nat. Druggist.

*Mouth-wash of Dr. H. Miller.*—The following mouth-wash is stated to be able to destroy all bacteria, found in the mouth, within one minute, and should be used twice a day:

| | |
|---|---|
| Thymic acid | 0.25 gm. |
| Benzoic acid | 3.00 " |
| Tincture of eucalyptus | 15.00 " |
| Absolute alcohol | 100.00 " |
| Oil of wintergreen | 35 drops. |

Mix.

After each meal the mouth should be rinsed with a 3-per cent. solution of boric acid.—Pharm. Zeits. Russl., 1892, 27.

*Oxin.*—Rousseau has given this name to a kind of "saccharated" meat, which is prepared by pounding the pure meat (freed from bone, fat, and sinews) with sugar, and keeping it for some time at 40° C. This preparation can, of course, be concentrated by warming it sufficiently long.—D.-A. Apoth. Zeitg., Aug. 1891, 73, from Pharm. Centralh.

*Luminous Paints.*—Zeits. Oester. Apoth.-Ver., quoted in Am. Drug. (Aug. 1891, 250), has the following formulas:

*Orange,* 46 parts varnish are mixed with 17.5 parts prepared barium sulphate, 1 part prepared Indian yellow, 1.5 parts prepared madder lake, and 38 parts luminous calcium sulphide.

*Yellow,* 48 parts varnish are mixed with 10 parts prepared barium sulphate, 8 parts barium chromate, and 34 parts luminous calcium sulphide.

*Green,* 48 parts varnish are mixed with 10 parts prepared barium sulphate, 8 parts of chromium oxide green, and 34 parts luminous calcium sulphide.

*Blue* is prepared from 42 parts varnish, 10.2 parts prepared barium sulphate, 6.4 parts ultra-marine blue, 5.4 parts cobalt blue, and 46 parts luminous calcium sulphide.

*Violet* is made from 42 parts varnish, 10.2 parts prepared barium sulphate, 2.8 parts ultra-marine violet, 9 parts cobaltous arsenate, and 36 parts luminous calcium sulphide.

*Gray,* 45 parts of the varnish are mixed with 6 parts prepared barium sulphate, 6 parts prepared calcium carbonate, 0.5 parts ultramarine blue, 6.5 parts gray zinc sulphide.

*Yellowish-Brown* is obtained from 48 parts varnish, 10 parts precipitated barium sulphate, 8 parts auripigment, and 34 parts luminous calcium sulphide.

*Luminous Colors for Artists' use* are prepared by using pure East India poppy oil, in the same quantity, instead of the varnish, and taking particular pains to grind the materials as fine as possible.

*For Luminous Oil-color Paints*, equal quantities of pure linseed are used in place of the varnish. The linseed oil must be cold pressed, and thickened by heat.

All the above luminous paints can be used in the manufacture of colored papers, etc., if the varnish is altogether omitted, and the dry mixtures are ground to a paste with water.

The luminous paints can also be used as *wax colors for painting on glass* and similar objects, by adding, instead of the varnish, 10 per cent. more of Japanese wax, and one-fourth of the quantity of the latter of olive oil. The wax colors prepared in this way may also be used for painting upon porcelain, and are then carefully burned without access of air. Paintings of this kind can also be treated with water-glass.

*Paper—Acidity of Drawing Paper.*—P. Norman Evans and Quirin Wirtz refute the statement of Noel Hartley that the sulphuric acid used in treating the paper pulp is not properly washed out, and that paper therefore reacts acids with litmus and helianthin. They point out that the washing is continued for four hours in a stream of hard water; what has misled Hartley is that the paste used for sizing contains alum. This will make the paper react as stated, but not with congo-red, which, however, the merest trace of sulphuric acid will turn blue.—Chem. Drug., March 1892, 366.

*Parchment Paper—Presence of Lead.*—Herz has found from 32 to 2700 mgm. of lead to the kilo of parchment paper; a contamination which doubtless is due to the sulphuric acid employed.—Sueddeutsche Apoth.-Zeitg., 1892, 58.

*Paper—Transparent.*—A convenient method for rendering paper transparent consists in brushing it with a solution of 1 part of castor oil in 3 parts of absolute alcohol, and allowing it to dry by exposure to the air.—Pharm. Post, 1892, 510.

*Test-Paper.* See under *Charta*.

*Pepto-Santal.*—J. A. Fort proposes to use what he names "pepto-santal," in place of the oil of sandalwood, of which only small doses can be borne. Pepto-santal is prepared by Vicario, and appears to be a product of the pancreatic digestion of the oil of sandalwood.—Pharm. Post, 1891, 1009, from Deutsche Med. Zeitg.

*Photography—Chemistry.*—An instructive paper on this subject by F. Park will be found in Pharm. Journ. Trans., Dec. 1891, 474–476, Drug. Circ., 1891, 271.

*Photography.*—A scientific exposition of the chemical changes attending photographic operations, by H. E. Armstrong, will be found in Chem. News, 1892, lxv., 181.

*Photography.*—Detailed directions for making and using orthochromatic collodion emulsion, by A. Jonas, will be found in Drug. Circ., 1892, 9, from Chem. Drug.

*Polishing Paste for Silver.*—Mix 500 gm. of prepared chalk, 100 gm. of calcined deer's horn (hartshorn), and 100 gm. of powdered cuttlefish-bone with 300 gm. of liquefied vaselin to an homogeneous mass.—Zeit. Oester. Apoth.-Ver., 1891, 433.

*Asbestos-Porcelain.*—F. Garros grinds asbestos to an impalpable powder, removes the iron, etc., with hydrochloric acid, makes the powder into a paste with water, and bakes it in a porcelain furnace for 18 hours at 1200° C. Filter tubes made from this porcelain filter quicker, and sterilize better, than the ordinary porcelain filters.—Chem. News, 1892, lxv, 11, from Comptes Rend., 1891, cxiii.

*Adulterated Preserves—Examination.*—Capdeville gives his method for analyzing tomato preserves, which, of course, will do as well for other red preserves. The suspected preparation is first examined microscopically, comparing it with sections of the original fruit and likely adulterations. He then examines for the usual artificial coloring matter, especially eosin, cochineal and grenadin. *For eosin:* 5 gm. of the preserve are treated in a test tube with a mixture of 25 c.c. of distilled water, 1 c.c. ammonia and 25 c.c. amylic alcohol. The mixture is then filtered, and in case the filtrate is rose-colored eosin is present, which is also shown by the fluorescence. *For cochineal:* 5 gm. preserve are treated for 24 hours with 30 c.c. alcohol of 95 per cent.; the liquid is then filtered and the alcohol evaporated on a water-bath. Should this residue on treatment with ammonia give a red color, cochineal is present. *For grenadin:* The preserve is treated with alcohol, the solution filtered and the filtrate evaporated to dryness. The residue is treated with water, which dissolves the grenadin, and this aqueous solution is used for dyeing silk. Hydrochloric acid does not, while a solution of chloride of lime does decolorize the silk even at ordinary temperatures.—Am. Journ. Pharm., 1891, 557; from Bull. Therap., 1891, 277.

*Quickine.*—Another antiseptic, contains 1 part of carbolic acid and 0.02 parts mercuric chloride in 1,000 parts of a mixture of alcohol and water. —Am. Journ. Pharm., 1892, 139; from Pharm. Zeitg., 1892, 40.

*Sawdust Bread.*—H. Krug converts sawdust into sugar, and adds 40 per cent. flour (wheat, oats, rye, etc.); if considered necessary, a certain percentage of phosphates, etc., is added, and biscuits made from it. It is stated to be a good cattle-food.—Pharm. Post, 1892, 411.

*Snuff for Hay Fever.*—Boric acid, 2 gm.; sodium salicylate, 2.5 gm.; cocaine hydrochloride, 0.12 gm. Mix.—Chem. Drug., May 1892, 745.

*Sponges—Bleaching.*—The best way in which to bleach sponges by bromine, according to Roeser, is the following: Wash the sponges first with warm distilled water, containing in each liter 20 drops of a 10-per cent. solution of caustic soda; then rinse them in pure distilled water (warm), so as to deprive them of everything soluble in this liquid. The temperature of the water here and subsequently should be about 104° to 110° F. (Ordinary water, if practically pure, may be used.)

Press the excess of water from the sponges, then immerse them, without squeezing, into a glass jar containing dilute bromine water. The latter is prepared by adding to each liter of warm distilled water, 30 gm. (1 ounce) of a saturated solution of bromine in water. Leave the sponges in the liquid until they are decolorized; then remove them, press them, and repeat the treatment once or twice with fresh bromine water until they are as white as is desired or possible. Next immerse them in warm water rendered slightly alkaline (with 20 drops of a 10-per cent. soda solution to each quart of water), and, lastly, wash them with pure warm water until they are odorless.—Am. Drug., 1891, 317, from Bull. Commercial.

*Sponge Fisheries of the Bahamas.*—J. F. Coonley has written an interesting article on this subject, which may be read in Am. Drug., 1891, 361, from Scient. American.

A detailed account of the sponge fisheries as carried on at Florida, will be found in Drug. Circ., 1892, 6-7.

*Iodoform Sponges.*—Rettenheimer boils silk-sponges in water to free them from impurities, then puts them for five days in 5 per cent. hydrochloric acid, when they are washed, dried, and transferred to a 7.5 per cent. solution of iodoform in ether; after evaporation of the ether, the sponges are kept in well-closed vials.—Pharm. Post, 1891, 1012, from Prag. Med. Wochens.

*Sulphocalcine.*—This American proprietary remedy for diphtheria, according to the "Real Encyclopædie," consists of a mixture of lime, sulphur, benzoic acid, boric acid, oils of eucalyptus and gaultheria, and pancreatin. —Zeits. Oester. Apoth.-Ver., 1892, 215.

*Sinodor.*—This is the trade name of a deodorizing compound, especially adapted for the arm-pit and sweaty feet. It is a more or less thick mixture of 40 gm. calcined magnesia in 1 kilo. of a 20 per cent. (sp. gr. 1.0762) solution of magnesium acetate. Archiv Pharm., 1892, ccxxx, 173.

*Sinodor—Tooth-Paste.*—Mix 1 kilo. of a 20 per cent. solution of magnesium acetate with 60 gm. of calcined magnesia, and sufficient carbonate of magnesium to make a thick paste; perfume with oil of peppermint.—Archiv Pharm., 1892, ccxxx., 173.

*Toothache Drops.*—R. Good. Creasote, 1 fl. oz.; oil of peppermint, ½ fl. oz.; oil of cloves, 1 fl. oz.; chloroform, 1½ fl. ozs.—M.—Pharm. Record, 1892, xiii., 122.

*Kalodont.*—"Seifenfabrikant" says a very similar preparation can be made by mixing equal parts by weight of powdered soap, chalk and glycerine and bringing it to the proper consistence with water. Then color with carmine, perfume with peppermint oil, warm on a water-bath, and pour into suitable tubes. Chem. Drug., Feb. 1892, 283.

*Tooth Preparations.*—Collections of formulas will be found in Pharm. Era, 1892, 12, and in Pharm. Record, 1892, xiii., 248. See also under *Pulveres.*

*Varnishes.*—Some practical remarks on the nature and judicious preparation of varnishes, by Hugo Mueller, will be found in Chem. Drug., Feb. 1892, 314; from Nature.

*Celluloid-Lacquer (Varnish).*—E. Andres dissolves uncolored celluloid in a mixture of alcohol and ether, pouring off the clear liquid. It will be cheaper, however, to dissolve gun-cotton, previously well dried over sulphuric acid, in 3 or 4 times its weight of ether, and 3 to 6 times its weight of alcohol, and add to the solution 25 to 50 per cent. (of the weight of the gun-cotton) of camphor. The varnish may be colored by aniline colors. It is durable, dries rapidly, is very lustrous, and does not crack.—Zeits. Oesterr. Apoth.-Ver., 1892, 314; from Neue Erfind. Erfahr.

*Varnishes for Skin Diseases.*—The following varnishes are recommended by Unna:

*Bassorin Varnish.*—Mucilage of tragacanth (15 : 100) is filtered in a steam funnel, evaporated to a suitable consistence, and mixed with a convenient quantity of glycerin.

*Casein Varnish.*—Milk is curdled with rennet, and the casein washed and dried, forming a sandy, yellowish-white powder. 20 parts of the dry casein are dissolved in 77.5 of water, containing 2.5 of borax.

*Glycerin-casein Varnish.*—Dissolve 1 part of casein in 3 to 3.5 parts of ammonia and add 1 part of glycerin; heat until the ammonia is dissipated. One part of this varnish gives a nice, quite permanent emulsion with 2 parts of boiling water.

*Amber Varnish.*—An alcoholic solution of amber in oil of turpentine. This varnish must not be used as excipient for oxide of zinc.

*Castor Oil-Shellac Varnish.*—One part of shellac, ⅓ part of castor-oil and 3 parts of alcohol, give a varnish which is easily removed by alcohol.

*Canada Balsam—Collodium Varnish.*—Sixteen parts of collodium and 1 part of Canada balsam. It is very suitable for pyrogallol, and can be washed off with ether-alcohol.

*Castor-oil—Collodium Varnish.*—Eight parts of collodium and 1 of castor-oil.

*Ricinoleate of Lead Varnish.*—Boil one part of litharge with 1½ parts

of castor-oil until a plaster is formed which is dissolved in 2 parts of absolute alcohol.

These varnishes can be combined with the various substances used in skin diseases.—Pharm. Post, 1891, 983; from Therap. Monatsh.

*Arabol-Gum.*—This is the name given to an artificial product containing water 15.12 per cent., ash 0.81 per cent., maltose 24.23 per cent., dextrin 54.48 per cent., starch 4.18 per cent., acidity expressed in percentage of KOH 0.43 per cent.

According to F. M. Horn the following method gives a similar product: 100 gm. wheat starch are heated with 500 c.c., water containing 10 gm. oxalic acid in a water-bath at 90° C. for four hours, stirring occasionally; after neutralizing with powdered marble and filtering, the transparent yellow filtrate is evaporated and dried in a water-bath until the mass retains only 14 per cent. moisture.—Am. Journ. Pharm., 1892, 309; from Pharm. Post, 1892, 525.

*Indian Gums.*—S. Rideal has had placed at his disposal a series of gums which have been collected from trees of known botanical origin and in most cases from known localities.

The author has described the physical and chemical properties of these gums, for which reference must be had to the original article.

The trees whose gums were collected, are: *Acacia Arabica; Acacia Catechu; Acacia Farnesiana; Acacia ferruginea; Acacia leucophlœa; Acacia modesta; Albizzia amara; Anogeissus latifolia; Bauhinia variegata; Bauhinia retusa; Buchanania latifolia; Odina Wodier;* and *Terminalia tomentosa.*—Pharm. Journ. Trans., June 1892, 1073-1076.

*Bassorine—New Vehicle.*—G. Barker calls attention to a substance named "bassorine," which is mainly composed of tragacanth, glycerin and water, as a suitable excipient for aqueous extracts, resorcin, ichthyol, etc. Its advantages over collodium are that it does not give the uncomfortable feeling of stiffness, it is easily removed by water, and it is quite invisible.—Pharm. Journ. Trans., Nov. 1891, 468.

*Sticky Fly-Paper.*—First, size the paper well with a flour-paste, made from 1 pound of wheat-flour and 1 gallon of water; after drying, spread the following mixture as thin as possible with a short bristle brush: 1 pound of white rosin and 8 oz. castor oil, melted over a slow fire.—Chem. and Drug., July 25, 1891, 143.

*Wart—Solution.*—A mixture of 1 part each of salicylic and lactic acid, and 8 parts by weight of collodion, is highly recommended for warts. Apply twice a day.—Chem. Drug., Jan. 1892, 109.

*Antidote to Insect Bites.*—Ferry recommends fresh urine as the remedy, and thinks that the urea is to be credited with the effect. He relates two cases of rattlesnake bites cured by the application of the cut-up snakes, the contents of the intestines of which consist mainly of impure urea.—Pharm. Post, 1891, 691, from Dietetic Gazette.

# MATERIA MEDICA AND BOTANY.

## A. Vegetable Drugs.

### GENERAL SUBJECTS.

*Acidum Boricum—Boric Acid in Vegetables.*—A. Gassend reports (*Ann. agronom.*, xvii., 352), having found from 5 to 10 milligrams of boric acid per liter in a large number of South European wines. Treating the ash of 10 c.c. of wine with alcohol and sulphuric acid, the green flame is not produced, but the boric acid is readily recognized by turmeric paper and by means of the spectroscope. Traces of this acid were also determined in grapes, apples, certain pears, potatoes, radishes and lettuce, but not in tea, saffron, or cow's milk.—Am. Jour. Pharm. 1892, 137.

*Adulterations.*—Report of Willis G. Tucker, M. D., Ph. D., analyst of drugs. Extract from the 11th annual report to the State Board of Health (New York), pp. 65.

The report shows about the same conditions as the preceding one (see Amer. Jour. Phar., 1890, p. 477); perhaps an improvement may be noticed in the condition of the following articles which make the least favorable showing. Of 46 samples of the compound spirit of ether 12 were of good or fair quality; 17 out of 30 specimens of stronger ether passed inspection; of 20 samples bought as saffron six passed muster, the remaining consisting of safflower; of 37 samples of precipitated sulphur, 10 were correct, 5 were sublimed or washed sulphur, and the remainder consisted of milk of sulphur contaminated with calcium sulphate.—Am. Jour. Pharm., 1891, 471.

*Examination of Spices.*—At the recent meeting of food chemists and microscopists in Vienna, the following maximum and minimum figures for the examination of spices were proposed: *Allspice,* not more than six per cent. ash, of which not more than 0.5 per cent. should be insoluble in hydrochloric acid; *cinnamon* should not yield more than 5 per cent. ash, not more than 1 per cent. insoluble in hydrochloric acid; should yield not less than 1 per cent. volatile oil; *cloves* not more than 7 per cent. ash, not more than 1 per cent. insoluble in hydrochloric acid, not less than 10 per cent. volatile oil; *black pepper,* not more than 6.5 per cent. ash, not more than 2 per cent. ash insoluble in hydrochloric acid, not more than 15 per cent. nor less than 12.5 per cent. moisture; *white pepper,* maximum ash percentage 3.5 per cent., 1 per cent. ash insoluble in hydrochloric acid, moisture as above; *saffron,* not more than 8 per cent. ash, 0.5 per cent. ash insoluble in hydrochloric acid, 13-14.7 per cent. moisture, 6–7 per cent. chloroform extract.—Chemiker Ztg., 1891, 1543; Am. Jour. Pharm., 1891, 598, 599.

*The Pharmacopœia Standards of Purity—Drugs and Chemicals.*—Be-

ing the results of examination of important chemicals and drugs extending over a period of from eight to ten years, by T. A. Ellwood.—Phar. Jour. and Trans., 1891, 392–396.

*Spurious Drugs Recently Met With.*—In an article read before the "Liverpool Chemists' Association," Mr. T. H. Wardleworth considers samples of spurious drugs which have come to his notice during the past few months. The following is a list of the spurious drugs: Jalap, sarsaparilla, calumba root, calabar bean, croton seeds, balsam copaiba and kola nut. This is a valuable and interesting paper, as Mr. Wardleworth has collected facts and data concerning the sophistication as well as the origin. —Pharm. Jour. and Trans., 1891, 438, 439.

*Drug Adulteration and Its Prevention.*—By R. H. Kimball. Pharm. Era, Aug. 1891, 103.

*Adulteration of Spices.*—Mr. Clifford Richardson has conducted an examination, under the direction of Dr. H. W. Wiley, of the foods which enter into general daily consumption.—Pharm. Era, March, 1892, 146, 147.

*India Rubber—Sources.*—I. A. Sherman states that between thirty and forty sorts and grades of India rubber are to be found exposed for sale, these variations being in a measure due to the different methods of gathering the sap, which in all instances is a crude method. Para rubber comes from the Amazon district, and that from the vicinity of the river Purus, a tributary of the Amazon, is considered the best. The Para variety has its grades of fine, medium and coarse. Caucho rubber comes from Peru, near the sources of the Amazon. Ceara rubber is deficient in elasticity, and is sometimes called "mule-gum." Bahia and Pernambuco largely comes in sheets. Mangabeira rubber is like the last two named varieties. Central America furnishes sheet and scrap from Nicaragua; "Carthagena strip" comes from New Granada; Honduras furnishes the "Tuno" variety; Guatemala, a poor sort containing much resin; Angostura is nearly equal to Para variety; Guayaquil furnishes a moderate quantity; Guiana an excellent grade, which comes in shape like sausages. Colombia rubber finds its way largely to Para.

Asia contributes largely from Assam, the shape being largely in slabs wrapped in plaited straw, and this chiefly goes to Europe. Borneo rubber is mostly of a poor quality. Africa furnishes rubber from Madagascar, Tamative being the place of export. The best varieties are ranked next to Para in general use and quality. The Congo region, Sierra Leone and Liberia, on the West Coast, export large quantities of good average rubber.—Pharm. Record, 1891, xii., 456, from India Rubber World.

*India Rubber—Action of Metals and Acids.*—W. Thomson and F. Lewis have studied the influence of metals, salts and acids on rubber, and arrived at the following results. Of all the metals, copper has a very in-

jurious action on rubber; still more injurious are copper sulphate and manganic oxide; of acids (100 parts neutralizing 100 parts of a 10-per cent. solution of anhydrous sodium carbonate) they found, contrary to expectation, that chromic acid did not destroy the elasticity of the rubber; nitric acid destroyed it quickly. Although ozone acts very injuriously on rubber, peroxide of hydrogen has no action.—Chem. News, 1891, lxiv., 169–173.

*Caoutchouc—Vulcanization.*—C. A. Fawsitt proposes, instead of free sulphur or antimony sulphide, the use of which requires an elevated temperature, to employ sulphur chloride, dissolved in carbon disulphide.—Dingler's Journal, through Chem. News, July 3, 1891, 13.

*Rubber Goods.*—An account of the different stages through which India rubber has to pass in order to make tubing, rings and corrugated matting, will be found in Pharm. Record, 1892, xiii., 59, from India Rubber World.

——— *Keeping.*—Soft rubber tubes are best kept in water, containing a little salt.—Zeits. Oester. Apoth.-Ver., 1891, 433.

——— *Restoration of Elasticity.*—It is recommended to put them into a mixture of two parts of water and one part of ammonia for a short time (a few minutes to half an hour).—Zeits. Analyt. Chemie, 1891, 609.

*Nomenclature, Botanical and Pharmacopœial, etc.*—Notes on Nomenclature. George B. Sudworth, N. L. Britton, B. E. Fernow. Mr. Sudworth favors the use of specific names identical with generic in binomials if the name has priority. Dr. Britton expresses himself in favor of this method, and further favors the citation of the original author of the name only, as is done by zoölogists. Mr. Fernow favors the double citation.—Gard. and For., iv., 165, 166, 202, 213, 214, 239.

Notes on Nomenclature. George B. Sudworth.—Gard. and For., 1892, 98, 99.

*A New Departure in Botanical Nomenclature.*—An argument against the use of specific names identical with generic, by Edward L. Greene, of Cal.—Pittonia, ii., 213–215.

*On the Citing of Ancient Botanical Authors,* being a reply by Dr. Britton to Prof. Greene's scholarly paper in "Pittonia," relative to this important and exciting subject of "Botanical Nomenclature." Dr. Britton argues that it is better not to go back of Linnæus for the names of genera.—Bull. Torr. Bot. Club, 1891, 327–330.

*Botanical Nomenclature, with especial reference to "Pharmacographia,"* by Mr. Druce.—Pharm. Jour. and Trans., 1892, 749, 750, 789, 941.

*Pharmaceutical Etymology.*—A new part of the Philological Society's "English Dictionary" was published in 1891, comprising all words beginning with "e," up to and including "every." It includes a large number of words used in botanical, medical and other sciences.—Chem. and Drug., 1891, 82, 83, 925; also Pharm. Era, Sept. 1891, 171, 172.

*Synonyms and the British Pharmacopœia.*—The Chem. and Drug. (1891, 246, 27) reprints an abstract of the report of the Pharmacopœia for 1890, in which it is stated that Prof. Attfield argues with energy and with unquestionable force in favor of "freely adding to the number of official synonyms" in the British Pharmacopœia.

*Pharmacopœial Nomenclature and the Latin of Prescriptions.*—By Prof. J. P. Remington. (Am. Med. Assoc., May 1891; Pharm. Era, Dec. 1891, 357; Jan. 1892, 7–9.)

*The Etymology of the Root.*- By K. Lettenbaur. (Ber. d. Pharm. Ges., 1891, 221–237.)

*Popular German Medical Names.*—(Pharm. Rundschau, 1892, 16–18; 37–40; 63–65; 88–91; 107–110; 134–137.)

*Etymology of the Common Medicinal Names.*—By J. Holfert. (Ber. d. Pharm. Ges., 1891, 296–303.)

*International Congress upon Chemical Nomenclature in Geneva.*—Chem. Zeitung, 1892, 567–589.

The following is a list of some common and local names which appeared in the Pharmaceutical Record concerning a number of medicinal plants:

| | | |
|---|---|---|
| 1. | Stepmother | Viola tricolor. |
| 2. | Crystal wort | Hepatica Americana. |
| 3. | Swallow wort | Euphorbia prostrata. |
| 4. | Hip fruit | Rosa canina. |
| 5. | Bitter-bloom | Sabbatia angularis. |
| 6. | Caribbee bark | Exostemma caribeæ. |
| 7. | Nigger toes | Bertholletia excelsa. |
| 8. | Wooray balley | Strychnos toxifera. |
| 9. | Gingelly | Sesamum indicum. |
| 10. | Wood spurge | Euphorbia amygdaloides. |
| 11. | Jack-in-the Pulpit | Arum triphyllum. |
| 12. | Canoe birch | Betula alba. |
| 13. | Swine bread | Cyclamen Europæum. |
| 14. | Golden club | Orontium aquaticum. |
| 15. | Cheeses | Malva rotundifolia. |
| 16. | Gladwine | Iris fœtidessima. |
| 17. | Hen and chickens | Bellis perennis. |
| 18. | Redwood | Pterocarpus santalinus. |
| 19. | Giddy berry | Viburnum lantana. |
| 20. | Canchalagua | Erythræa venusta. |
| 21. | Wild hippo | Euphorbia corollata. |
| 22. | Cape gooseberry | Physalis Alkakengi. |
| 23. | Chop nut | Physostigma venenosum. |
| 24. | Withy | Salix alba. |
| 25 | Coral root | Corallorhiza odontorhiza. |
| 26. | Red berry | Panax quinquefolia. |
| 27. | Cacahute | Arachis hypogæa. |
| 28. | Crazy weed | Astragalus mollissimus.<br>Oxytropis Lamberti, also Sophora sericea. |
| 29. | Squirrel grass | Hordeum jujugbatum. |
| 30. | Quinine bush | Garrya Fremonti. |

—Pharm. Record, 1892, 1.

*Olea Œtherea.*—(See also under respective drugs in the Natural Orders.)

*Ethereal Oils—Olefinic Constituents of.*—By F. W. Semmler. Geranaldehyde, $C_{10}H_{16}O$, boils at 224–228°, under a pressure of 760 mm., and at 110–120° under a pressure of 12 mm.; the sp. gr. is 0.1972 at 15°/15°. The compound is optically inactive; the refractive index indicates the presence of two ethylene bonds, and this view is supported by the formation of a *tetrabromo*-additive compound which has not yet been obtained in crystals. Hydroxyl may be substituted for the bromine atoms, and the products thus obtained are being further investigated.

Orange oil appears to contain from 0.5 to 0.75 per cent. of oxygen; its sp. gr. is 0.8435 at 20°/20°; on treatment with hydrogen sodium sulphite, a crystalline compound is formed; on decomposing this and distilling the oily product, geranaldehyde is obtained, together with a very small quantity of a lower boiling aldehyde. "Citral" is the technical term applied to an ethereal oil which is contained to the extent of 6–8 per cent. in lemon oil; this substance proves to be identical with geranaldehyde, which is also found in a number of other ethereal oils.

On heating geranaldehyde with hydrogen potassium sulphate for 20 minutes at 170°, and distilling the product in a current of steam, cymene, $C_{10}H_{14}$, is obtained, and is regarded as being formed by elimination of water from the aldehyde.

Coriander oil consists of terpenes and about 90 per cent. of another substance which is termed coriandrol, and may be readily separated by distillation under reduced pressure. *Coriandrol*, $C_{10}H_{18}O$, boils at 194–198° under a pressure of 760 mm., and at 85–90° under a pressure of 20 mm., the sp. gr. is 0.8679 at 20°/20°, and the molecular refraction 49.07; this points to the existence of two ethylene unions in the compound. It combines with two molecules of bromine, and on treatment with silver oxide, a hydroxyl derivative is formed.

Linaloe oil appears to be a mixture of several compounds, but no terpenes could be detected. The principal constituent, which is termed *linalool*, boils at about 195–190° (? 185–190°), and has a sp. gr. 0.8702 at 20°/20°; the molecular refraction is 49.33; the compound combines with 4 atoms of bromine, and resembles geraniol.

A sample of "German melisse oil" gave a compound with sodium hydrogen sulphite; this was decomposed in a current of steam; the resulting product has the formula $C_{10}H_{18}O$, and boils at 204–209°; the sp. gr. is 0.8681 at 15°, and the molecular refraction 48.59. It combines directly with 2 atoms of bromine. On treating the compound $C_{10}H_{18}O$ with silver oxide, the corresponding *acid*, $C_{10}H_{18}O_2$ is obtained, which is liquid; the *silver salt* is white. On oxidation, the aldehyde yields isovaleric acid.

The above compound $C_{10}H_{18}O$ is identical with a technical product termed "citronellone" and with a compound with the same name prepared

by Gladstone and Wright; it is also probably the same as the citronellic aldehyde of Dodge (compare Am. Jour. Ph., 1890, 356.)

The author applies the term "olefinic camphenes," to compounds of the formulæ $C_{10}H_{20}O$,$C_{10}H_{18}O$,$C_{10}H_{16}O$. These, which are always open chain alcohols, aldehydes, or ketones, have a sp. gr. of 0.86 to 0.90 at 20°/20°, and a higher refractive power than the isomeric compounds with closed chains.—Berichte, 24,201–211; reprinted from Jour. Chem. Soc., 1891, 539; Am. Jour. Pharm., 1891, 452, 453.

*Oils—Olefinic Constituents of Ethereal Oils.*— F. W. Semmler (*Ber. d. D. Chem. Ges.*, 1891, 201), describes the following: (1) *Geranial* (Geranium aldehyde) $C_{10}H_{16}O$ is a light yellow fluid, which is obtained colorless by distillation in vacuo, and possesses an odor of lemon and orange. It boils at 224–228° C. at 760 mm. and 110–112° C. at 12 mm. pressure; its specific gravity is 0.8992, and it has no action on polarized light. (2) *Oil of orange peel* contains geranial, and a lower boiling aldehyde. (3) *Citral*, a body isolated by Schimmel & Co., from oil of lemon, lemon grass and citronella is identical with geranial. (4) Geranial boiled with double the amount of bisulphate of potassium yields cymol. (5) *Oil of Coriander* distilled in vacuo yielded terpenes and coriandrol, $C_{10}H_{18}O$, boiling at 194–198° C. at 760 mm. with partial decomposition, and at 85–90° C. at 20 mm. pressure. It is dextro-rotary, and takes up four bromine atoms. (6) *Linaloe-oil* (Licaria guianensis, *Aublet*, Lauraceæ) contains linaloöl $C_{10}H_{18}O$, having the specific gravity 0.8702 at 20° C., and is lævogyre. (7) Oil of melissa (German) contains an aldehyde, probably identical with citronellol of Dodge (A. J. P., 1890, 13, 355). (8) As olefinic camphors the author regards bodies having the formulas $C_{10}H_{20}O$, $C_{10}H_{18}O$ and $C_{10}H_{16}O$, which are not benzol derivatives. These bodies as far as known are liquid, have a lower specific gravity and a higher refractive power than the aromatic camphors. They are either alcohols, aldehydes or ketones.— Am. Jour. Pharm., July 1891, 341.

*Essential Oils.*—After the introduction of the concentrated essential oils by Hänsel (*Am. Journ. Pharm.*, 1888, 451), it was hardly deemed possible to prepare oils of superior quality, inasmuch as these oils represent the natural oils freed from the non-odorous terpenes; H. Hager in *Pharm. Post*, 1891, 807, acknowledges the receipt of some samples of volatile oils which proved upon comparison to have a finer flavor and to be even better than the oils from the first-mentioned source; they are also more soluble in dilute alcohol. For these oils the name "Ætherische Grundœle" (fundamental essential oils) is used: in Latin, the term *Protoleum* or *Protolum* is suggested, as for instance Protoleum Carvi. The preparation of this class of oils is the secret of the manufacturing firm of Altmann & Vogel, in Cotta-Dresden.— Am. Jour. Pharm., Nov. 1891, 536.

*Detection of Salicylic Acid in Salicyl-aldehyde and Methyl Salicylate.*— In

the course of an investigation of Spiræa Ulmaria, Dr. A. Schneegans and J. E. Gerock noticed that if the colored solutions which these substances form with ferric chloride be agitated with ether, the colorations due to salicyl-aldehyde and methyl salicylate were discharged, while that due to salicylic acid was not affected. In place of ether, chloroform, amyl-alcohol, acetic ether, carbon disulphide, petroleum ether, kerosene, paraffin oil, benzol, toluol, xylol and pure aceton can be used; if the coloration be obtained in alcoholic solution, diluting with the above-mentioned liquids will also discharge the color. If to 10 c.c. of the solution, containing 0.020 salicyl-aldehyde, 2 c.c. of a ferric chloride solution (the officinal solution diluted with 99 volumes of water) be added, the violet coloration is discharged by agitation with 5 c.c. chloroform; if now 1 c.c. of a solution containing 0.00002 salicylic acid be added, there remains, after agitation, a distinct coloration. This test is of practical importance in testing the artificial oil of wintergreen for free salicylic acid. If the oil be agitated with 500 parts of water, and 10 c c. of this turbid mixture with 1 c.c. of the diluted ferric chloride solution and 5 c.c. chloroform be shaken together, a colorless mixture results if no free salicylic acid is present; if, however, 500 parts oil contain only 1 part free salicylic acid, there will be sufficient acid present in the 10 c.c. of the mixture taken to produce a perceptible violet coloration if the vessel be held against a white background. —Journ. der Pharm. v. Els.-Lothr., 1891, 285; Am. Jour. Pharm., 1892, 22–23.

*The Purification of Resinified Essential Oils* is best effected by neutralizing with sodium carbonate and distilling in a current of steam; the oil will be almost pure, but may have a yellowish color. To remove the color and to obtain the oil perfectly pure, it is placed in a flask with several pieces of stick potash, warmed to 50–60° C., allowed to stand over night, and then distilled over a naked flame; bumping is prevented by adding a minute quantity of talc to the oil before distilling. - Dr. H. Werner, Pharm. Zeitung, 1892, 39; Am. Jour. Pharm., 1892, 139.

*Notes on Essential Oils.*—Being notes from the October Berichte of Messrs. Schimmel & Co., of Leipzig, upon the important essential oils.—Pharm. Journ. Trans., 1891, 292, 328 331.

*Notes on some Essential and Medicinal Oils.*—P. L. Simmonds has collected together some useful information upon the following oils: Adul or odul oil, ajowan oil, Joannesia princeps, Velloso, (Anda Gomessii, Juss.); angelica oil, angustura oil, aniseed oil, Artemisia eriopoda, Aristolochia reticulata, Nutt.; Atalantea monophylla, Correa, balm oil, bay oil, becuiba oil, bergamot, betel leaf oil, bonduc-nut oil, borneen, buchu leaf oil, cade oil, cajeput oil, camphor oil, cananga oil, carapa oil (crab oil), caraway oil, cardamom oil, carrot oil, cascarilla oil, cassia oil, castor oil, cedar oil, cedrat, Celastrus paniculatus, Milld. (Scotia paniculata, Don), celery oil,

chaulmoogra seed-oil, citral, citronella, Cleome viscosa, clove oil, colocynth oil, copaiba oil (capivi oil), croton oil, cubeb oil, culilawan oil, cumin seed-oil, cumara oil, dalbergia, dill oil, elemi oil, eucalyptus oil.

*Notes on Essential Oils.*—From the April Report of Schimmel & Co., Leipzig.—Am. Drug., 1891, 137.

*Improvements in the Manufacture and Production of Medicinal Compounds from Ethereal Oils.*—J. V. Johnson, London. From F. von Heyden (Nachfolger), Radebeul, Germany. Eng. Pat. 19,074, Nov. 24, 1890, 6 d. The patentee prepares odorless, tasteless, neutral products of menthol, borneol, geraniol, thymol, carvacrol and gaultheria oil.—Journ. Soc. of Chem. Indus., 1891, 1027.

*For the Detection of Oil of Turpentine in Volatile Oils.*—L. Crismer proposes (*Bull. Soc. Chim.*) a solution of potassium acid tartrate, 20 gm., neutralized with manganous carbonate (about 6 gm.), in 1 liter of water. To apply the test 3 c.c. of this solution, 5 c.c. of the volatile oil and 5 drops of ammonia water are well shaken, the mixture then heated in a water-bath and a current of air passed through the mixture for thirty seconds. The oils of lemon and bergamot become dark brown, and oil of turpentine of an intense brown-black; most other volatile oils, if pure, acquire only a faint yellowish tinge.—Am. Journ. Pharm., 1892, 228.

*Oils, volatile—Test for Oil of Turpentine.*—L. Crismer neutralizes 20 gm. of potassium bitartrate dissolved in one liter of water, with 5 to 6 gm. of manganous carbonate. 5 c.c. of the oil to be tested, 3 c.c. of the above solution, and 5 drops of ammonia (0.925) are well shaken together in a test tube, which is then placed in a water-bath, and a current of air passed through the contents for 30 seconds. The tube is then removed, its contents well shaken, and allowed to separate. With the exception of the oils of bergamot and lemon, which are colored dark-brown, the majority of pure oils are but faintly tinged with yellow, whereas the addition of oil of turpentine darkens the color from brown to intense brownish-black.—Journ. Chem. Soc., 1892, lxi. Abstr. 387; from Bull. Soc. Chim., vi. 29.

——— Cripps finds the apparatus, described under *Copaiva* (for the estimation of the volatile oil), well adapted for the detection of oil of turpentine in volatile oils; for at the very first appearance of steam in the tube, between the small flask and the test-tube, the odor is readily recognized at the mouth of the test-tube.—Pharm. Journ. Trans., 1891, 193.

*Essential Oils—Purity.*—E. Hirschsohn has communicated a new method of examining the essential oils of coniferæ, which is based on the relative proportion of oil to water in the first distillate (10 c.c. of the oil distilled with steam, and separated in fractions of 100 c.c. each); the different solubility in alcohol of the fractions; and the behavior of the oils with Dragendorff's "bromchloroform" and with Hirschsohn's "acetic acid

reagent." The first is a solution of 1 part of bromine in 20 parts of chloroform, and the second a mixture of 10 gm. of acetic acid anhydride and 5 drops of concentrated pure sulphuric acid. Of oil of turpentine he says that of a good quality of freshly-distilled French oil, the first fraction should contain at least 58 per cent. of the oil, and the first two fractions together from 96 to 98 per cent.; a smaller percentage would indicate resinification. This would also be shown by the solubility of the third fraction in alcohol (90 p. c.). Of a recently-distilled oil, this fraction is considerably less soluble (1 vol. in 16 vols.) than the first or second fraction (1 vol. in 5 vols.); the third fraction of resinified oil is easily soluble (1 in 1). For details, reference must be had to Pharm. Zeits. Russl., 1891, 31–41, or Pharm. Zeitg., 1891, 725.

*Volatile Oils—Iodine Absorption.*—See remarks under *Oil of Peppermint.*

*Volatile Oils—Action of Bromine, and Properties of Pinen Dibromide,* $C_{10}H_{16}Br_2$.—By O. Wallach.—Chem. Zeitg., Rep., July 1891, 192, from Annalen, 1891, cclxiv., 1.

*Volatile Oils—Detection of Alcohol.*—J. Warin recommends to shake the suspected oil with a little oil of turpentine, whereby the mixture will be rendered turbid. He has tried this test successfully with eucalyptol and oil of bergamot; creasote responds to the test when the addition of alcohol exceeds 10 per cent. The oil of turpentine, however, must in this case be poured in so as to form a layer, when the line of contact will appear milky, which milkiness disappears on shaking.—Pharm. Post, 1892, 559, from Bull. Comm. Pharm., 1892, 187.

*Oils, volatile—Detection of Metals.*—Several of the volatile oils of commerce have been found by Hirschsohn to contain lead or zinc from the containers. This might easily be detected by shaking a few drops of the oil with a solution of sulphuretted hydrogen, when the globules of oil will become more or less colored.—Am. Journ. Pharm., 1892, 81, from Pharm. Zeits. Russland, 1891, 790.

*Essential Oils—New Reagents.*—Mr. Perrot finds that the following reagent colors only those essential oils which are alcohols, ethers, aldehydes, and phenols intensely blue, but it does not color the pure hydrocarbons and the fixed oils.

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|---|---|
| Violet de Paris (dimethyl-aniline, $C_{38}H_9(C_2H_4)_5N_3O_2$) | 0.1 gm. |
| Glacial acetic acid | 10 c.c. |
| Alcohol (90 per cent.) | 100 c.c. |
| Distilled water | 90 c.c. |

Add to 10 c.c. of this solution 10 c.c. of acetic acid and 80 c.c. of alcohol (40). It colors the following oils: anise, bitter almonds, camphor, cinnamon, gaultheria, geranium, lavender, mustard, nutmeg, peppermint,

and also borneol, eucalyptol, thymol, eugenol, etc. It does not color turpentine, lemon, bergamot, capaiva sandal-wood, etc., nor the fixed oils.—Apoth.-Zeitg. (Rep.), 1891, 116, from Union Pharm., 1891, 253.

*Oils—Essential—Color Reaction.*—Charles Rice points out that Perrot's reaction is of only limited value (see the above list of oils not tinted by the reagent), so much the more as it gives no clue to the nature of the adulterant.—Am. Drug., 1892, 60.

*Protoles.*- "Protoles" is the name applied by H. Hager to a new kind of concentrated essential oils manufactured by Altmann and Vogel, which in some respects are claimed to be superior to the well-known concentrated oils of H. Haensel.—Pharm. Post, 1891, 807.

*Terpenes and Camphors.*—O. Wallach has written a paper, containing the most important results obtained up to the present time, from which we take only the following (see also a paper by Charles Rice, in Proceedings 1886, 529–534):

The terpene-like hydrocarbons can be divided according to their empirical formulæ into three classes: (1) Hemiterpenes or pentenes, $C_5H_8$. (2) Terpenes, $C_{10}H_{16}$. (3) Polyterpenes, $(C_5H_8)_n$. The terpenes at higher temperatures split up into unsaturated hydrocarbons of the series $C_5H_8$, whose best known representative is isoprene. Isoprene can undergo polymerization into $C_{10}H_{16}$, and a further polymerization into $C_{15}H_{24}$, $C_{20}H_{32}$, etc. Ordinary terpene is also polymerizable into such polyterpenes.

*Terpenes.*—The following terpenes are known: (1) Pinene; (2) camphene; (3) fenchene; (4) limonene; (5) dipentene; (6) sylvestrene; (7) phellandrene; (8) terpinene; (9) terpinolene. *Pinene* forms the main constituent of ordinary oil of turpentine, occurs as an essential ingredient of the ethereal oils of most pines, and in greater or smaller quantity in many other ethereal oils. *Camphene* is obtained from camphor through borneol or from pinene. *Fenchene* is closely related to camphene, and is obtained in a similar way from fenchone, a compound isomeric with camphor. *Limonene* occurs in the ethereal oils of the Aurantiaceæ, in oils of cummin, dill, Erigeron canadense and in oil of fir needles. *Dipentene* is closely related to limonene. It is formed from limonene and pinene by the action of heat or acids, and occurs in oils of camphor and elemi, in Russian and Swedish turpentine, and is formed by the dry distillation of caoutchouc, and as a by-product in the formation of cineol, terpene hydrate, and terpineol. *Sylvestrene* occurs in British and Swedish turpentine. *Phellandrene* occurs in the oils of bitter fennel, water fennel, elemi and eucalyptus. *Terpinene* is a product of the molecular change of other terpenes; it occurs naturally in oil of cardamom. *Terpinolene* is only slightly known.

The terpenes exist in physically different modifications. Thus the pinene of American turpentine is dextro-rotatory, and that of French tur-

pentine is lævo-rotatory. By the action of mineral acids or by heat the optically-active terpenes are rendered optically inactive; the inactive modifications are obtained by mixing equal proportions of the optical antipodes. For the chemistry of the terpenes the reader is referred to the original paper.—Jour. Chem. Soc., Sept. 1891, 1078–1084, from Ber., xxiv., 1525–1579.

See also Pharm. Journ. Trans., 1891, 1892, 553, 574.

*Terpenes and Derivatives.*—By E. Kremers. Pharm. Rundschau, N.Y., 1891, 159, 217, 237, etc. The article is too long and too elaborate to be satisfactorily abstracted, and therefore reference must be had to the original.

*Thymacetin* is a compound related to thymol in the same manner as is phenacetin to phenol; it has the formula $C_6H_2(CH_3)(C_3H_7)(OC_2H_5)NHC_2H_3O$. It forms a white crystalline powder only slightly soluble in water; in doses of 0.25 to 1.0 gm., it generally relieved nervous headaches and occasionally acted as a hypnotic.—Pharm. Zeitung, 1892, 40; Am. Journ. Pharm., 1892, 139.

*Olea Fixa.*—(See also under respective drugs in the natural orders.)

*Fixed Oils—Iodine Absorption.*—To determine the most reliable method of conducting this analytical operation, Dr. Holde carefully investigated the several conditions necessary, and as the result publishes the following procedure: Of non-drying oils 0.3 gm. and of drying oils 0.2 gm. are taken and dissolved in 18–20 c.c. chloroform in a flask of about 300 c.c. capacity; to the non-drying oil 50 c.c. iodine solution (which must not be more than 2 weeks old) are added, to the drying oil 60 c.c. of an iodine solution (which must be less than 8 days old) are added. Two determinations of each oil should be made and the absorption allowed to proceed for two hours. Two blank tests must be made, the mean of the two giving the value of the iodine solution; the first one is made by titrating at once 50 c.c. of the iodine solution with the sodium thiosulphate solution after adding 40 c.c. 10 per cent. potassium iodide solution, using starch solution as the indicator; in the second one the iodine solution is allowed to stand for two hours before titrating. After allowing the tests to stand two hours, 40 or 50 c.c. (10 per cent.) potassium iodide solution (the latter quantity for drying oils) and 120 c.c. water added and the excess of iodine titrated with the sodium thiosulphate solution. Should the chloroform solution of the oil become cloudy during the two hours, more chloroform must be added. Working after this method the following iodine-absorptions were obtained: Linseed oil, 172–180; hempseed oil, 175, 176; poppyseed oil, 139–143; sesame oil, 106–109; cotton-seed oil, 110–115; crude rape oil, 100–108; refined rape oil, 100–107; arachis oil, 91.2–101.5; olive oil, 79–84 (88); bone oil, 59.1–81.7. It is worthy of attention that the drying oils by this pro-

cedure give much higher figures than those published by Hübl; in the case of linseed oil Hübl gave 156–160; the difference is caused by using a very considerable excess of iodine from the beginning, thus insuring a more complete absorption.—Chemisches Repert., 1891, 228; Am. Journ. Pharm., Oct. 1891, 485.

In the Am. Journ. of Pharm., 1891, 484, the method proposed by Dr. Holde was published. In the Chemiker Zeitung, 1891, p. 1791, Dr. W. Fahrion published an article upon the same subject which offers some very decided improvements over the method of Dr. Holde: These are (1) a simple, although not new method, for the standardization of the thiosulphate solution; (2) the excess of iodine solution is exactly stated; (3) the iodine solution is capable of being used even after standing for several months; and (4) that the determination for both drying and non-drying oils is identical.

The necessary reagents are as follows: Mercuric chloride solution, 60 grams in one liter 95 per cent. alcohol; iodine solution, 50 grams in one liter 95 per cent. alcohol; thiosulphate of sodium solution, 24 grams of the crystallized salt in one liter distilled water; potassium iodide solution, 10 per cent.; potassium bichromate solution, 3.874 grams pure, dry salt in one liter water; chloroform; dilute hydrochloric acid.—Am. Jour. Pharm., 1892, 79–80.

*Tests for Fixed Oils.*—Dr. Holde states that of the numerous tests proposed for the identification of fixed oils in admixture, there is only one the reliability of which has not been questioned, namely, the test for sesame oil with hydrochloric acid and sugar (formation of a red color).—*Pharm. Zeitung*, 1892, 40.—Am. Jour. Pharm., 1892, 139.

*Fixed Oils—To Detect Mineral Oils in.*—P. Soltsien treats the oil with concentrated sulphuric acid, and, after the action is complete, agitates thoroughly with petroleum ether, separates the latter, evaporates it and examines the residue left on evaporation. The process depends upon the formation of compounds of the fixed oils and sulphuric acid which are not soluble in petroleum-ether, while the mineral oils are not changed, and are therefore soluble in petroleum-ether. The presence of small quantities of rosin oil in boiled linseed oil was detected by this method.—Am. Jour. Pharm., Nov. 1891, 539.

*Detection of Rosin Oil in Fatty and Mineral Oils.*—By A. Grittner. (Zeit. Ang. Chem., 1891, 265.)—Abst. Jour. Chem. Soc., 1892, 548, 549.

*Perfumes—Plants Yielding.*

*Odorous Woods.*—By John R. Jackson, curator of museum, Kew. (*Chem. and Drug.*) Sandal wood and plants which bear the name of sandal wood and other fragrant woods.—The Drug. Circ. and Chem. Gaz., 1891, 220, 221.

*Australian Perfume Plants.*—Bosisto, in calling attention to the possi-

bilities of Victoria as a perfume centre, mentioned as specifically Australian perfume plants *Pittosporum undulatum*, *Boronia megestima*, and *Eurybia argophylla*.—Chem. Drug., Nov. 1891, 804.

*The Perfume Industry in the United States.*—(J. N., in Garden and Forest.)--Pharm. Era, July 1891, 39.

*Wissenschaftliche Drogenkunde—"Scientific Drug Information."*—An illustrated text-book on Pharmacognosy and a scientific guide for the detailed botanical study of drugs, for apothecaries, by Dr. Arthur Meyer, a. o., Prof. in der Königl. Akademie Münster, i. W. First part with 269 illustrations, and second part with 387 illustrations. Berlin, 1891. R. Gaertner, publishers.

The author believes that the German apothecary. in order to keep his recognized position among scientists, must become more familiar with the drugs from a scientific standpoint—certainly to discern their genuineness and purity. This difficulty is increasing, owing to the new introduction of drugs. And more especially is it difficult for the apothecary to recognize the drugs as supplied to him in a powdered and cut condition, as this requires even greater skill. Looking at the condition and future of the apothecary in this new light, the author has published this work.

The first purpose of the author is to so teach the student and apothecary that they can independently examine drugs. As there is no hand-book upon the morphology and anatomy of plants primarily for the use of the pharmacist, before considering the drugs themselves, the author devotes several chapters to the general morphology and anatomy of plants. He also gives a typical picture of the phænogamous plants, so that each single part as described may be used as a reference. The terms and synonyms employed are such that the student will easily comprehend them. In arranging his material the author has consulted De Barry's Anatomy and Haberland's Physiological Plant Anatomy. He also considers the physiology and biology of plants.

In the special part devoted to pharmacognosy, the author arranges the drugs according to their morphological character. Each department, as that of seeds and roots, has an introduction, a description of the general character of the seeds, and notes. This is done so that the student may quickly recognize the drug by its principal characters.

The botanical portion of the monograph is divided into two parts: Morphological and Anatomical. In the first portion the morphological description of the drug is given so far as the scientific facts are known, and especially only those are considered which can be unmistakably observed. The second portion is subdivided into two parts, of which the first treats of those anatomical characters discerned by the eye or an ordinary lens, and the second part goes further into detail.

The illustrations in the work have been mostly drawn by the author.

The illustrations of the botanical part of the work are mostly of his own observations. He does not consider the errors in the text-books, but says that any one sufficiently interested can refer to the principal text-books (which he mentions) to confirm his work. Besides the chapters given, he considers the origin, cultivation, collection, chemistry, and history of drugs. The last chapters are taken from the excellent work of Flückiger. Concerning the adulterations and mistakes observed in commercial drugs, they are only mentioned but not described. At the close of the monographs he refers to the old and new drugs. The secretions of the plants employed in medicine he does not consider, as they ought to be worked into a book on pharmaceutical chemistry, which he has in preparation. A few of the more recent drugs undescribed in the work will be described in a supplement which will follow.

The author divides the work into the following parts:

I. Introduction.

1. Lessons in Scientific Drug Information or Pharmacognosy.
2. Methods in the Botanical Research of Drugs.
   (a) Morphological Botany.
   (b) Anatomical Botany.
      ($\alpha$) Instruments.
      ($\beta$) Micro-chemical reagents.
      ($\gamma$) The preparation and study of the object.

II. General Morphology of Phænogams.

III. General Anatomy of Phænogams.

IV. Special Morphology and Anatomy of the Exterior Organs of the Plant and of those Parts employed as Drugs.

1. Seeds; 2. Roots; 3. Stems; 4. Leaves; 5. Flowers; 6. Fruits; 7. Other Organs; 8. Medicinal Herbs; 9. Drugs from the Cryptogams.

It appears to be an admirable work and a valuable addition to the works on Pharmacognosy which have been issued this year. The ideas and methods employed by the author are in conjunction with the advance and spirit of the age.

*The Officinal Plants of the German Pharmacopœia for Pharmacists and Physicians.* By Dr. F. G. Kohl. With 165 hand-colored plates accompanying the text. It will be issued in 33 parts; as yet six have appeared. The plates are beautifully made. They show the officinal parts and give diagrams of the parts of the flower and fruit. The parts which have appeared include the Gramineæ, Aroideæ, Palmæ, Liliaceæ, Irideæ, Scitamineæ, Orchideæ, Cupuliferæ, Juglandaceæ, and Urticaceæ. (Leipzig, Verlag von Ambr. Abel, 1892).

*Pharmakognosticher Atlas.*—By Dr. J. Moeller. With 110 plates. Berlin: Julius Springer, price 25 s. The importance of educating pharmaceutical students in the use of the microscope as the only means of de-

tecting impurities in powdered drugs received official recognition two years ago in Austria, when a course of microscopical pharmacognosy was made an obligatory part of the pharmaceutical curriculum. The primary object of the atlas, now being published, is to assist the students during their studies. It is not, however, alone to this class that it appeals; pharmacists and public analysts will alike find it indispensable.

The drugs to be treated of, number in all 120. The work is to be completed in June, and consists, as its title indicates, of a series of plates accompanied by descriptive letter-press. The first part deals with the principal starches (13 in number), lycopodium, kamala, lupulin, tragacanth, drugs that are used in the form of powder, together with some of the leaves.

The illustrations of the starches are, perhaps, the most accurate that have ever been published. In the case of leaves, particular importance has been attached to the epidermis of both surfaces, stomata, hairs, glands, etc., as observable in the powdered drug, since it is in these that distinctive characters are to be sought. Sections of portions of the leaves are represented when desirable. To each plate is attached a short description, in which particular attention is directed to characters possessing a diagnostic value; in this a special feature of the work is to be discerned, and one which will render it unique and invaluable.

With the exception of Vogl's Atlas, in which more prominence is given to sections and less to powders, the Pharm. Jour. and Trans. (1892, 1039, 1040) says: "We know of no work approaching this of Prof. Moeller's in scope or in execution. The author's wide reputation as a microscopist will be a sufficient guarantee that the standard reached in the first part will be maintained throughout the work. When complete, the 'Atlas of Pharmacognosy' will be indispensable as a work of assistance and reference to every student, pharmacist and public analyst."

*Manipulations de Botanique Médicale et Pharmaceutique.*—Iconographie Histologique des Plantes Médicinales; par MM. Joseph Hérael et Valère Bonnet. Préface par M. le Professeur G. Planchon. With 36 colored plates and 223 figures scattered in with the text. The first part is devoted to the consideration of general histological methods. It the second part, he considers the more important drugs; the botanical origin, description, histology, substitution and uses. It is a handsomely published book, and one of great value to the pharmacist and student.

*Pharmakognosie des Pflanzenreiches*, von F. A. Flückiger. Dritte Auflage. Mit einem geschichtlichen Anhange. Berlin, 1891. (Pharmacognosy of the Vegetable Kingdom.) By F. A. Flückiger. With an historical appendix. The new edition of Prof. Flückiger's work represents the progress in our knowledge of the principal drugs during the past eight years, in addition to the value the older editions have merited.

*Die Botanische Mikrotechnik.* A Handbook of Microscopical Prepara-

tions, Reactions and Methods of Staining, by Dr. A. Zimmerman, Privatdozent in the University of Tübingen. In this work the author has made a compilation of the most useful and practicable methods found in the various original dissertations, text-books and scattered literature, and closes with a catalogue of the literature relating to this work. He does not consider that which is only of historical interest.

This is one of the most important works in relation to the microscope and the technology connected therewith which have as yet appeared. The first part of the work is devoted to observations upon living plants and plant-cells. The study of dried plants. Maceration. Swelling. Clearing, by chemical and physical methods. The best method for transferring a mount from water to Canada balsam. The transferring of specimens from water to Canada balsam, avoiding alcohol. The living color. Fixing and staining methods. Washing. Technique with the microtome: Paraffin imbedding and picking up the specimen. The making of permanent preparations.

Part II. (A) is devoted to the micro-chemistry of the inorganic constituents in the plant. Part II. (B) is devoted to the organic compounds found in the plant. He considers the tests for the fatty and the aromatic compounds, among which may be mentioned the phenols, acids, aldehydes, terpenes, glucosides, bitter principles, coloring matters, alkaloids, protein compounds and ferments.

Part III. Methods of study of the cell-membrane, contents of cells and their modifications.

The Appendix is devoted to methods for study of bacteria. A catalogue of botanical-microscopical literature and an alphabetical index.

*Staining—Stains for Vegetable Tissues.*—E. Vinassa has investigated the value of aniline colors for staining vegetable tissues, and found that the colors may be divided into three groups: 1. Those which stain the parenchym only. 2. Those which stain the lignified tissues, collenchym, vessels, nuclear sheaths and the like, and those which merely differentiate, that is, render more conspicuous the thickened cells from the surrounding parenchym. In order to get a well-stained section, the protoplasm must be removed. The sections are therefore boiled with a little soda lye, and then washed out with much water, if necessary, with the addition of acetic acid. After draining, the sections are put into a ½ to 1 per cent. staining solution, and then, after two or three minutes, well washed. If the intention is merely to differentiate, then the well-boiled sections are put into a very diluted stain solution, which has been heated nearly to boiling, and left there until the sections appear darker than the solution. They are then washed.

*Double Staining.*—Put the sections first into the stain which colors the lignified tissues, etc., wash out well, then put them into the stain for parenchym (heated to 100° C., and rendered somewhat alkaline, if neces-

sary). Vinassa found that colors which are fast on cotton stain the parenchym, and those which dye wool and silk directly, stain the lignified tissues, etc. Some of the colors are precipitated by alkalies and some by acids; this is necessary to bear in mind in the further treatment of the stained sections, so as not to put the section in a medium which precipitates the color. The location of tannic acid in plants can be found by treating the section with a color that is easily washed out, and then wash it, when only those parts which contain tannin will retain the color.

For the list of the 51 colors examined, reference must be had to the Microscopical Bulletin, 1891, 41, or to the original in Zeits. wissenschaftl. Mikroskopie, 1891, 34–50.

W. Finselbach communicates the method employed in the botanical laboratory in Geneva (Switzerland), which he considers the most expeditious and at the same time so simple that even apprentices can apply it successfully. The respective drugs are first boiled for some time in a test tube or flask with water; leaves for about five minutes, stems, roots, barks from 15 to 20 minutes, in order to expel the air, and also to regain their original shape. They are then transferred to a mixture of equal volumes of alcohol and glycerin to soften sufficiently for section-cutting. The cell-content is best removed by transferring the sections to Javelle water (chlorinated soda) for 15 to 30 minutes, and then washing them thoroughly, after which the sections are put a few minutes in the "Geneva stain." Wash well, and mount in glycerin jelly.

"*Geneva Stain.*"—Dr. Chodat recommends the above-named double-stain for differentiating the different elements in a section. It consists of a one per cent. solution of congo-red, rendered faintly alkaline with ammonia, to which is added one per mille of chrysoidin. The stain must always be kept faintly alkaline, and protected from light.—Pharm. Zeitg., 1891, 651, 660.

*Seeds—Preparing for Microscopical Examination.*—Incidentally to some remarks on the adulterations of linseed and its meal, Van den Berghe recommends treating the portions of the seed or seed-vessels successively with dilute sulphuric acid (2.5 per cent.), soda solution (2.5 per cent.), alcohol and ether, and then digesting them for some hours, in the cold, with a concentrated solution of calcium chloride. This makes both the pericarps and the testa so transparent, that the distinctive characters can be readily recognized. Pharm. Journ. Trans., Nov. 1891, 406, from Bull. Soc. Microscop. Belge.

*Microscopy of Leaves.*—L. Petit thinks that the transverse section of petioles may furnish valuable hints to the determination of finely cut, respectively powdered, leaves, the arrangement of the various bundles being characteristically diverse. He has examined the petioles of 500 dicotyledons (48 families and 300 genera). He found that the petioles may be divided into two classes: (A) The terminal section of the petioles (that

is, the section nearest to the lamina of the leaf) incloses secretory canals: Umbelliferæ, Araliaceæ, Malvaceæ, Sterculiaceæ and Compositæ. Of these Umbelliferæ have a secretory canal behind each peripheric bundle, while the others have them arranged irregularly. (B) The terminal sections contain no secretory canals: Apocynaceæ, Asclepiadaceæ, Convolvulaceæ, Solanaceæ, Myrtaceæ, and Cucurbitaceæ, all of which contain bicollateral bundles; in the first five the median bundle is much developed. Several Rosaceæ, Malvaceæ, Geraniaceæ, Oxalideæ, Cupuliferæ, Amaranthaceæ, Chenopodiaceæ and Leguminosæ contain no bicollateral bundles. Scrophulariaceæ have the lower bundle preponderating, and furthermore have no sclerenchyme. In Oleaceæ the phloem is of more importance than in Scrophulariaceæ, where there are sometimes small prismatic crystals. Papaveraceæ and Compositæ possess secretory tissue; Compositæ have ordinarily thick and sometimes sclerenchymatous fibres, which are never found in Papaveraceæ. Cruciferæ have thick fibres, but no secretory tissue; many of them may be recognized immediately by the structure of their radiating bundles. Ranunculaceæ have their fibro-vascular bundles disposed on the transverse section in an ellipsis, in which the phloem is either circular or elliptical.

The general law on the disposition of the fibro-vascular bundles is, that in herbaceous plants they are normally isolated, while in woody plants they are in close proximity to one another.—Pharm. Journ. Trans., 1889, 65, from Mémoires Soc. Sci. Phys. Nat., Bordeaux, 1887, 217–404.

*The Micro-Chemical Study of the Alkaloids and Protein Substances.*—By L. Erréra. (Ann. Soc. Belge de Microsc.; durch Botan. Centralbl., 1891, 12, 222.)—Chem. Zeitung, 1891, 199.

*A Contribution to Pharmacognostical Microscopy*—By E. Vinassa. (Reprint from Ztschr. wissenschaftl. Mikroskop. u. mikroskop. Techn., 1891, 8, 34.)—Chem. Zeitung, 1891, 257, 258.

*Detection of Stem Admixture in Root Drugs.*—Prof. E. S. Bastin, in the "Apothecary," calls attention to the stems present in root drugs derived from shrubby or tree-like plants, and of those from perennial herbs that have rhizomes. He considers Ipecacuanha, Pareira, Gelsemium, Glycyrrhiza, the two Apocynums (A. cannabinum and A. androsæmifolium), and Hydrangea. He gives the readiest means for distinguishing an admixture of the stems.—Phar. Jour. and Trans., 1892, 652–654.

*Spices—Examination.*—At the recent meeting of food-chemists and microscopists in Vienna, the following maximum and minimum figures for the examination of spices were proposed: *Allspice*, not more than six per cent. ash, of which not more than 0.5 per cent. should be insoluble in hydrochloric acid; *cinnamon* should not yield more than 5 per cent. ash, not more than 1 per cent. insoluble in hydrochloric acid; should

yield not less than 1 per cent. volatile oil; *cloves* not more than 7 per cent. ash, not more than 1 per cent. ash insoluble in hydrochloric acid, not less than 10 per cent. volatile oil; *black pepper*, not more than 6.5 per cent. ash, not more than 2 per cent. ash insoluble in hydrochloric acid, not more than 15 per cent. nor less than 12.5 per cent. moisture; *white pepper*, maximum ash percentage 3.5 per cent., 1 per cent. ash insoluble in hydrochloric acid, moisture as above; *saffron*, not more than 8 per cent. ash, 0.5 per cent. ash insoluble in hydrochloric acid, 13–14.7 per cent. moisture, 6–7 per cent. chloroform extract.—Am. Jour. Pharm., 1891, 598, from Chem. Zeitg., 1891, 1543.

*Microscopy.*—A series of papers on microscopy as applied to pharmacology will be found in Pharm. Journ. Trans., 1891, May, 1017; July, 21; Oct., 325; Dec., 489; 1892, February, 650, 750, 797.

*Anise—Microscopy of Powder.*—By J. Moeller.—Pharm. Post, 1892, 24–29; 177–183.

*Poisons—Plants Yielding.*

*Shukai.*—This is a Persian drug sold in all Indian bazaars. It is said to be useful in palsy, melancholia, leprosy, etc. Two varieties are described. W. Dymock and C. J. H. Warden examined the plant chemically and found it to contain a soft resin, tannin, and a principle which gave marked reactions with all alkaloidal reagents.—Phar. Jour. and Trans., 1891, 552, 553.

*Ipoh Arrow Poison.*—In the November Kew Bulletin, Mr. Leonard Wray publishes an interesting letter in which he states that the juice of the Antiaris, used by the Semangs in Perak, is certainly poisonous, and crystals of antiarin can be readily detected under the microscope in the evaporated juice. A specimen of the poison sent to Kew, which was found to be inert, must have undergone a change, as it was found to be poisonous to dogs before it was sent. The Semangs sometimes mix other poisons with the milky juice of the antiaris. One of these, named "likir," is the juice of the tuber of a species of Amorphophallus and the other, called "gadong" is derived from Dioscorea hirsuta, Blume. The Sakais, living in the hills, use a poison prepared from plants named respectively "ipoh aker" (a species of Strychnos), "prual" (a rubiaceous climber), and "lampong" (a species of strychnos). The ipoh aker is said to retain its virulence for years.—Phar. Jour. and Trans., 1892, 613.

*Poisonous Plants—British.*—In Science Gossip for April appears an article treating upon Solanum Dulcamara, Aconitum Napellus, Conium maculatum, Datura Stramonium, Hyoscyamus niger, Atropa Belladonna, Digitalis purpurea, Lactuca virosa, and Daphne Mezereum. The folk-lore is touched upon. The poisonous properties and their causes are discussed, and the author ventures a suggestion that the raphides found in some liliaceous plants may also be poisonous.—Pharm. Journ. and Trans., 1892, 891.

*South American Anno Poisons.*—Being an account of the preparation of a kind of curare, as described by Paul Marcoy (in his "Travels in South America," 4to, London, 1875, ii., page 303, etc.). Reprinted in American Druggist, 1891, 309, 310.

*Obeah Poisons.*—By E. M. Aaron (Scientific Am.; Pharm. Era, Dec. 1891, 333).

*East and West Indian Poisons and Poisoners.*—By Eos (a regular correspondent of the English Mechanic).—National Drug., Sept. 1891, 114–116.

*Arrow Poisons* of the Malays.—Am. Drug., 1892, 74.

*Preservation of Drugs—Insects in Drugs.*—J. F. Jackson, curator of the New Botanical Gardens in its journal alludes to this subject, and refers to a paper on this subject read at the meeting of the American Pharmaceutical Association in 1874, and says that the *tinea zea*, or Indian-meal moth is the fellow that is the worst enemy of drugs. It eats most anything, not being particular whether its diet be taraxacum, aconite root, rhubarb, burdock, pearl barley, ergot, capsicum, or corn meal. *Pyralis farinalis*, or meal moth, is another troublesome enemy, and eats flaxseed meal and all kinds of farinaceous material. A small brown beetle, the *anobium*, is not at all particular as to its diet, and does great harm. The cure for their foraging is the application of small quantities of chloroform or bisulphide of carbon, and on exposure of the drug to the atmosphere in a few moments the odor is lost.—Pharm. Record, 1892, 85.

*To keep Drugs*, which are easily attacked by insects, R. Idelson sprays them with ether, and places them in a tightly stoppered glass container which has been rinsed with ether, and is then kept in a dark and cool place. This plan has been found very satisfactory in keeping raspberries, juniper berries, taraxacum and parsley roots, etc.—Pharm. Ztschr. f. Russl., 1891, 757; Am. Jour. Pharm., 1892, 80–81.

*Change in Moulded Nitrate of Silver in Contact with Seeds.*—A. Barillé (Rép. de Pharm., 1891, 47, 403), has examined the cause of the change in moulded silver nitrate when kept with coriander or linseed to prevent breakage. The change which takes place consists in the corrosion of the sticks and the blackening of the seeds. The cause seems to be the presence of volatile or fatty oils or mucilaginous compounds, these causing decomposition in the silver salt, especially in light. The author recommends the use of powdered pumice stone for preservation.—Am. Jour. Pharm., Dec. 1891, 596.

*Preservation of Medicines—Hints on.*—By Fred. Lascar.—The Drug. Circ. and Chem. Gaz., 1892, 123, 124, 1042, 1043.

*Medicinal Roots—How to Preserve.*—National Drug., Feb. 1892, 41.

*Chutama Resin—Properties.*—From the west coast of Mexico is ob-

tained a pitch-like, dark-brown gum resin, collected from an undetermined tree. Alcohol of 95 per cent. extracts from the crude product 65 to 75 per cent. of a brown, rather soft resin. On treating the crude chutama with carbon bisulphide, it is separated into two resins: alpha-resin, which is dissolved, and beta-resin, which remains. Alpha-resin is a rosin-like substance of a peculiar aromatic odor, and easily soluble in the usual solvents for resins. Its composition is, C=74.79, H=9.07, O=16.14 (all per cent.); the saponification number is 171–175, and the iodine number 48. Beta-resin has the composition C=67.09, H=7.17, O=25.74, and the iodine number 68.8.—Chem. Zeitg. (Rep.), 1891, 257, from Waarenk. Techn.

*Kreat.*—Of late years an East Indian plant of that name has been highly recommended as a bitter stomachic. Kreat, creyat, or more properly, kariyat, are names applied to two very distinct plants—namely, Swertia or Ophelia chirata, which furnishes chiretta and belongs to the Gentianaceæ, and Andrographis paniculata, which belongs to the Acanthaceæ. The name "kreat" properly belongs to the Andrographis, both the stalks and roots being known in Bengal under the Hindustani name of Maha-tita, meaning "king of bitters." This plant is an annual, growing about two feet high, and is very common in most parts of India and Ceylon, as well as in Java. It has been introduced into Mauritius and several of the West Indian islands. The stems are of a lightish-brown color, without any smell, but with a persistent bitter taste. It is officinal in the Pharmacopœia of India.—Chem. Drug., April 1892, 614.

*Lupines, Horse-chestnuts and Acorns—Rendered Palatable.*—P. Soltsien deprives the above-named substances and many other seeds of their bitter or otherwise disagreeable taste by treating them to exhaustion with cold water containing 10 per cent. of the weight of the seeds, etc., of ammonia (sp. gr. 0.960). They become quite palatable by this treatment, so that they may be eaten in the uncooked state.—Pharm. Centralh., 1891, 571–573.

*The Relation of Geography and Materia Medica.*—During the past few years the attention of E. M. Holmes, Curator of the Museum of the Pharmaceutical Society of Great Britain, has been repeatedly drawn to the necessity for a more accurate and more widely spread knowledge of the geographical sources of drugs. The importance of this knowledge is thoroughly recognized by Hanbury and Flückiger in "Pharmacographia," where the districts in which drugs are produced are very carefully and precisely laid down. The fact is, that drugs constantly find their way into commerce from new districts, differing considerably in properties and value from the official article. These may also pass into use and retail trade, and it is only when the patient notices a difference in the color and taste, or the physician observes an unlooked-for or defective result, or the chemist finds a difference in the working of the preparation, that the fact of a genuine

drug not being used is discovered. This very unsatisfactory state of things requires a remedy. The difficulties which beset the conscientious pharmacist who desires to supply the physician with reliable preparations of a strength as uniform as possible are numerous enough. The period at which a drug is collected, the care which is taken in drying and packing it, the age of the plant itself, and the climate and soil in which it is grown, are all factors which tend to cause variation in strength.

The difficulty of ascertaining the geographical source of a drug is, however, one that might be easily met by the framers of the Pharmacopœia.

In that work the geographical source of the drug is given in comparatively few cases. With "Pharmacographia" to fall back upon, there is no reason why the Pharmacopœia should not limit the geographical sources of drugs *intended for use in medicine* by mentioning the countries or districts from which they may be obtained. It would then be possible for chemists to specify by name the drug required, just as it is customary to order Jamaica or Cochin ginger, Bengal or China turmeric, or Natal or St. Vincent arrowroot. The simple use of the letters P. B. after the name of a drug would then in any case be sufficient basis for a legal action if the definition of the Pharmacopœia were not complied with. The way in which the absence of this specification in the Pharmacopœia works out in practice may be seen in the following instances, which Mr. Holmes well describes: coca, copaiba, cubebs, jaborandi, nux vomica, pareira brava, strophanthus, and white hellebore. These instances, as brought forward, indicate that in every case limited geographical sources, if mentioned in the Pharmacopœia, would lead to greater uniformity in medicinal preparations.—Am. Jour. Pharm., 1892, 246–250.

*Medicinal Plants of Gambia (Senegambia).*—The natives use *Argemone mexicana* for coughs, in form of an infusion of the leaves; *Waltheria americana* L., the leaves as a poultice for boils; *Parinarium macrophyllum*, Sabine, the powdered bark smeared over deep-seated pains; *Combretum racemosum*, the young leaves for killing round worms in children; *Oldenlandia senegalensis*, Hiern, as a vermifuge; *Spermacoce globosa*, S. et Thonn., and *Mitracarpum scabrum*, Zucc., the dried leaves for healing ulcers; *Vernonia senegalensis*, the leaves chewed as an astringent; *Vernonia nigritiana*, O. et H., the pounded and boiled root as a purgative; *Calotropis procera*, R. Br., the leaves applied warm for sprains, headaches, and other pains; *Heliotropium indicum* in infusion for gonorrhœa; *Phaylopsis parviflora*, the leaves as a hot fomentation over the spleen in ague cake; *Ocymum Basilicum*, an infusion of the leaves in fevers.—Pharm. Journ. Trans., Jan. 1892, 613, from Kew Bull.

*Pharmacographia Indica.*—A History of the Principal Drugs of Vegetable Origin met with in British India. By William Dymock, Brigade Surgeon, retired, etc., C. J. H. Warden, Surgeon-Major Bengal Army, etc., and David Hooper, Quinologist, etc. Parts I.–IV. 8vo. London: Kegan,

Paul, Trench, Trübner & Co., 1889–91. Part IV. has appeared in 1891, and treats of the drugs procured from the natural orders of Sapotaceæ, Styraceæ, Apocynaceæ, Asclepiadeæ, Loganiaceæ, Gentianaceæ, Convolvulaceæ, Solanaceæ, and several orders of minor importance.

*Notes on Some Indian Drugs and Products.*—Mr. T. Stephenson says it is interesting to note that many drugs which have been only recently introduced into this country, generally from the other side of the Atlantic, have been in use in another form in India from time immemorial. He exhibited the following drugs, and described them, at the evening meeting of the Pharmaceutical Society in Edinburgh: Agar agar, Areca nuts, Andrographis paniculata, Incense sticks, Aloes wood, Holarrhena antidysenterica, Andropogon laniger, Withania coagulans, and a false pellitory root.—Pharm. Jour. and Trans., 1891, 544, 545.

*Cultivation of Medicinal Plants in Japan.*—According to a recently published summary of the two annual reports of the Central Sanitary Bureau in Japan for the years 1888 and 1889, it appears that increasing attention is there being paid to the possibility of cultivating the medicinal plants of other countries. The following are some of the plants to the cultivation of which the Japanese are turning their attention: Opium, two or three different varieties of insect powder plants, Crocus sativus, Coca, Thymus vulgaris, Lavandula vera, Rosmarinus officinalis, Artemisia Absinthium, Olea Europæa, Rheum officinale, Hyoscyamus, Belladonna, Taraxacum, Aspidium Filix-mas, and forty-four others grown in the medical botanical garden, have lately been used in the pharmaceutical examinations, and doubtless unless the Japanese can import these drugs of good quality, and as cheap as they can prepare them at home, they will grow them extensively for home use.—Pharm. Jour. and Trans., 1891, 510.

*Malay Materia Medica.*—By E. M. Holmes.—Bull. of Pharm., 1892, 108–117.

*Mexican Drugs from the Vegetable Kingdom.*—By Prof. John M. Maisch. (Pharm. Post, 225, 256, 284, 314.) See Amer. Jour. Phar., 1891, 1, 67.

*Agricultural Industries of Mexico.*—The productiveness of Mexico is, perhaps, unsurpassed by that of any other country in the world. Owing to the diversified climate, the vegetable products are varied in the extreme. Mosses and lichens furnishing dyes, forests yielding the choicest timbers, cereals, foods, medicinal plants and fibre plants, grow in profusion. As regards the methods of cultivation, however, in vogue in Mexico, they differ but little from those employed by the ancient Egyptians.—Jour. Soc. of Arts, Jan. 1, 1891; Phar. Jour. and Trans., 1891, 591, 592.

*Botanic Drugs and Galenics.*—The following drugs are described generally and therapeutically so far as they are known: Arariba alba, Arariba rubra, Celastrus edulis, Ephedra andina, Hymenæa stigonocarpa, Mespilodaphne pretiosa, Pedalium Murex, Plumeria sucuuba, Solanum pteleæfolium, Tococa Ipé.—Merck's Bull., 1892, 280, 281.

*Chinese Medicines.*—A list of medicines of the Chinese prepared by P. L. Simmonds, F. L. S.—The Druggist's Bulletin, 1892, 23–26.

*Economic Plants.*—An index to economic products of the vegetable kingdom in Jamaica, compiled by W. Fawcett, Director of the Public Gardens and Plantations, Jamaica. This is an index of products from Jamaica, and has been prepared as an indication of the various uses to which plants growing in Jamaica may be put.

*Drugs from the German Colonies.*—The Pharmaceutische Zeitung publishes the first of what promises to be a series of exceedingly interesting articles on the progress which has already been made in the cultivation of drugs and other colonial produce in the German colonies. In this article they deal with Tobacco, Vanilla, Cotton, Tea, Coffee, Cocoa, Cinchona, Fruits, Spices, and Drugs.—Chem. and Drug., 1891, 790, 791.

*Saponin.*—By O. Hesse. (Lieb. Ann., 261, 371–378.)—Berichte, 1891, 24, 266, 267.

*Soap Plants.* - Prof. Bernardin published in 1875 a little pamphlet entitled "Classification de 40 Savons Végétaux." John R. Jackson, in the Chem. and Drug. (1891, 920, 921), publishes a few general notes on saponaceous plants.

*Waxes of Vegetable Origin.* - In the American Druggist for April, 1892, appears an interesting illustrated article upon the waxes of vegetable origin. The chief varieties considered are the Carnauba wax, Pela wax, Sumach wax, Kaga wax, Ibota wax, Stillingia tallow, Myrica wax, Orizaba wax, wax from stick-lac and Bahia wax.

## AMARYLLIDACEÆ.

*Agave.*—"Preparation of Pulque in Mexico," by Alfonso Mendizabal. This is an interesting account of the agave plantations in Mexico and of the preparation of the Mexicans' national drink, "pulque."—Gartenflora, 1891, 525; Am. Jour. Pharm., 1891, 593, 594.

*Alkaloids of the Amaryllidaceæ.*—These plants, although poisonous, have not yet been chemically examined; two (Amaryllis formosissima and Amaryllis Belladonna) are cultivated in gardens, because of their beautiful flowers. The alkaloids were obtained by extracting the powdered bulbs with alcohol, distilling off the solvent, taking up with water, precipitating with sodium carbonate and dissolving the precipitate in ether. The alkaloid obtained on evaporation of the solvent was purified by solution in acidulated water, precipitating and dissolving in ether or chloroform, finally, by crystallization from alcohol. *Amarylline* is the name proposed for the alkaloid from A. formosissima and *bellamarine* for that from A. Belladonna. Amarylline forms clusters of short needles, is slightly soluble in water, easily so in ether, chloroform and alcohol; melts at 196° C., apparently with slight decomposition; with the exception of platinic chlor-

ide, potassium bichromate and tannin, it yields precipitates with the alkaloidal reagents; with sulphuric acid it gives a red-brown color, which becomes green on addition of a few drops of water; mixed with sugar and then $H_2SO_4$ it gives a green, changing to yellow, color; with Froehde's reagent a brown-green, changing to dark green.

Bellamarine forms colorless needles, soluble in alcohol, ether and chloroform; it melts at 181° C. with darkening; it precipitates with all of the alkaloidal reagents; its most characteristic color reaction is with sulphuric acid, gray; upon warming, a pretty red.—Dr. B. Fragner, Pharm. Post, 1891, 421; Amer. Jour. Pharm., Aug. 1891, 404–405.

### AMARANTACEÆ.

*Achyranthes aspera, Linn.—Analysis.*—C. J. H. Warden has analyzed this plant, a native of India, where it is largely used in washing and dyeing, owing to the large quantity of alkali contained in its ash. The leaves, stems and roots, dried at 100° C., afforded respectively the following percentages of ash: Leaves, 24.334; stems, 8.672; roots, 8.863. The percentages of potassa in the ash were respectively: Leaves, 17.8454; stems, 32.0008; roots, 28.5830. Wormwood and fumitory contain respectively 9.74 and 21.9 per cent. of ash, of which potassa constitutes respectively 74.94 and 36.48 per cent.—Chem. News, 1891, lxiv, 161.

### ANACARDIACEÆ.

*Anacardic Acid.*—(Berichte von E. Merck, in Darmstadt, 1892.)—Jour. Phar. Chim., 1892, 250.

*Japan Wax and China Tallow Trees.*—Japan wax is obtained from the berries of a tree (rhus succedanea) which is found in Japan, China and throughout the East Indies. The wax is formed in the middle of the berry, between the skin and the seed, like the pulp of the grape. The wax is used, either alone or mixed with tallow, by the Chinese in the manufacture of candles. This tree should not be confounded with the "tallow tree" of China, which has a pith of solid tallow in all trees that have fully matured.—Western Drug., 1892, 18.

*Japanese Lacquer.*—Lacquer is obtained by making incisions in the lacquer tree, Rhus vernicifera, DC. (urushi-no-ki), which is cultivated in China and Japan, and attains a height of 24 to 30 feet, with a circumference often exceeding 3 feet. The large operators purchase from the peasants, owning the lacquer districts, a certain number of trees which are then turned over to workmen, each of whom has usually assigned to him one thousand young trees, or between six and eight hundred older ones, which occupy his time during the whole summer. The price of the trees is about \$70 to \$90 per hundred. The best lacquer is obtained from the lower part of the trunk and during the hottest season of the year. A single tree, when completely exhausted, usually furnishes between 25 and

50 gm. of the crude lacquer, which requires a process of clarification, being filtered several times, and triturated in flat tubs until homogeneous.

This juice appears in the form of a grayish-white, viscous mass, which exudes very slowly, turns rapidly yellowish-brown by exposure to the air, and afterwards turns black.—Am. Drug., Aug. 1891, 238.

### ANONACEÆ.

*Asimina triloba.*—Mr. Thos. M. Fletcher describes the fruit and bark of the tree.

Lloyd found an alkaloid in the seeds and a bitter extractive in the bark. No evidence of the alkaloid was found in the bark by Mr. Fletcher, although various tests were applied to detect one. Petroleum ether dissolved 3.53 per cent. from the finely powdered bark, which consisted of a fixed oil.

The most important constituents found by other solvents were 3.43 per cent. of resin, 9.50 per cent. of resin insoluble in ether, but soluble in absolute alcohol, and 8.00 per cent. of glucose and extractive soluble in distilled water. There were also determined 52.16 per cent. of woody fibre, 7.38 per cent. of moisture, and 4.20 per cent. of ash.—Am. Jour. Pharm., 1891, 476.

### APOCYNACEÆ.

*Alyxia buxifolia*, R. Br., is known in Australia as Tonka-bean wood.—Chem. Drug., 1891, 221.

*Apocynum Venetum, L.—Upon the Membrane of the Bast Cells.*—By Carl Mikosch.—Chem. Zeitung, 1892, 21, from D. Botan. Ges. Berichte, 1891, 9, 306.

*Carissa sechellensis*, Baker, and *C. xylopicron*, Thouars, natives of the Seychelles, Bourbon, and Madagascar, are known as "Bois sandal," although quite devoid of odor; the appearance is somewhat similar to sandal-wood.—Chem. Drug., Aug. 1891, 220.

*Nerium Oleander—Constituents of the Bark.*—E. Pieszczek treated the bark with light petroleum, and extracted a liquid fat and a wax-like crystalline compound. The bark was then exhausted with alcohol, the solution distilled to remove most of the alcohol, and filtered from a remnant of fat and a caoutchouc-like deposit. After several days nodular aggregates of very minute, almost colorless crystals formed. On recrystallization from dilute alcohol, the substance was obtained as a colorless, soft, crystalline mass, insoluble in water, light petroleum, ether, and chloroform, but easily soluble in alcohol. On warming with dilute hydrochloric acid, it gave the glucose reaction with alkaline copper solution. The alcoholic solution was not precipitated by tannin, platinic chloride, mercuric chloride, iodized potassium iodide, Nessler's reagent, lead acetate, or ammonia. It fused at 171° C., then decomposed with separation of carbon, and

burned with a smoky flame. In concentrated sulphuric acid it dissolved with a reddish-brown color, not essentially changed by bromine vapor. The author proposes the name *rosaginin*. It is exceedingly poisonous, resembling strychnine in its action. The mother liquid from rosaginin contained *neriin*, a glucoside identical with that which Schmiedeberg obtained from the leaves.—Yearbook Pharm., 1891, 170, from Archiv. Pharm., ccxxviii., 352-361.

*Nerium Oleander as a Succedaneum for Digitalis*.—By Dr. Felix Baron von Oefele.—Merck's Bull., 1892, 21-23.

*Plumeria alba*, L., a native of the West Indies, is sometimes used as a substitute for the true sandal-wood.—Chem. Drug., 1891, Aug., 220.

*Rauwolfia canescens*.—The bark contains 0.4 per cent. of an alkaloid, which is colored blood-red by nitric acid, the reaction being sufficiently delicate to enable one to localize the alkaloid in the bark microchemically. It is supposed that the bitter roots of Rauwolfia serpentina, trifoliata, spectabilis, and madurensis contain the same alkaloid.—Pharm. Centralhalle, 1891, 486.

*Rauwolfia* (*Ophioxylon*) *serpentina—Crystalline Principle*.—Bettink discovered a non-nitrogenous principle in the root of this plant. (See Proceedings 1888, xxxvi., 336, and 1890, xxxviii., 704). It has been found to be identical with plumbagin, and it is supposed that the root came from Plumbago rosea, which plant in Java bears the same vernacular name as R. (Ophioxylon) serpentina (Poeleh Pandak).—Pharm. Centralhalle, 1891, 486. (A description of the plant is to be found in Proceedings 1880, xxviii., 140.)

*Strophanthus Seeds—The Alkaloid, Value of*—M. Crinon (Südd. Apoth. Zeit.).—In a pamphlet devoted to the newer remedies, the author states that the seeds of Strophanthus hispidus contain 0.65 per cent. strophanthine, those of S. Kombé, 0.95 per cent., and those of S. glaber, 5 (!) per cent. The species Kombé and glaber yield crystallizable strophanthine, while that of S. hispidus is amorphous, and also 2.5 times less toxic than the crystallizable alkaloids. Hence the seeds of S. glaber are 5 times more poisonous than those of S. Kombe, and 25 times more than those of S. hispidus.—Western Drug., 1891, 338.

## ARALIACEÆ.

*Helixin*.—G. Joulin (*Jour. de Pharm. et de Chim.*, 1891, 11, p. 20), has isolated the glucoside helixin from the ordinary ivy, *Hedera Helix*. The leaves and stems of the ivy in the form of a very coarse powder are boiled with water, with decoction filtered and then treated with lead acetate. The precipitate is collected on a filter, washed with cold distilled water and decomposed with sulphuretted hydrogen. The resulting liquid is filtered and evaporated on a water-bath to the consistency of an

extract and this taken up with 85 per cent. alcohol. The alcoholic solution on spontaneous evaporation leaves helixin, a reddish yellow syrupy mass, possessing an astringent, slightly bitter taste. It is acid to test paper, without action on Fehling's test except on inversion with an acid. Helixin is soluble in water and alcohol, and insoluble in ether, chloroform and benzene. The color reactions are as follows: concentrated sulphuric acid, a brilliant red; concentrated hydrochloric acid, yellow; ammonia, yellow; pyridine, olive green precipitate; iron salts, green; sulphocyanide of potassium, rose, disappearing quickly; bichromate of potassium and sulphuric acid, red, then green; caustic soda, green. The aqueous solution of the glucoside foams just like solutions of saponin.—Am. Jour. Pharm., 1891, 597–598.

*Ginseng—Cultivation of.*—(Am. Jour. Pharm., 1891, 411, 412, from Am. Agriculturist.)

*Ginseng in Commerce.*—By J. Jones Bell. (From Pop. Science Monthly.)—Pharm Era, Sept. 1891, 137.

*Ginseng.*—By N. Pike. (Scientific American.)—Canad. Pharm. Jour., 1892, 154, 155.

*Ginseng—Adulteration.*—A queer adulteration is reported from Mansfield, Ohio. Ginseng filled with shot, in each piece from four to ten shots The party dug up the plant while growing, made a hole in the root, inserted the shot, and put the plant back again, its future growth covering up all traces of the "loading."—Pharm. Era, 1892, 210.

*Marlea Vitiensis*, Bth., a native of Australia and Fiji Islands, has a close-grained wood, of a bright yellowish color, and a musky odor.—Chem. Drug., Aug. 1891, 221.

ARISTOLOCHIACEÆ.

*Les Aristoloches.*—Étude de matière médicale, par Louis Planchon, Docteur en médecine, Pharmacien supérieur, etc., Montpellier: Hamlin Frères, 1891, 8vo, pp. 266.

A very interesting and valuable monograph on the medicinal species of Aristolochia. In the first part, a brief history is given of the genus, followed by the description of its botanical characters, its geographical distribution and its medical properties. The second part treats of the drugs examined by the author, consisting of branches and subterraneous parts, and which he divides into three groups, viz.: fibrous, of which A. Serpentaria and A. Clematitis furnish the types for short and elongated rhizomes; woody, the most numerous section embracing the guacos and mil-homens; and tuberous, which are again subdivided into three divisions: round (A. rotunda, pallida, etc.), long (A. longa, Fontanesi, etc.), and filipendulous (A. tenera and filipendulina). These drugs are considered and compared according to their physical and structural characteristics. The third part

of the work is devoted to the special study of the medicinal species, nearly one-half of the two hundred known species of Aristolochia being considered, more or less extensively, according to their importance and uses. In each case a full list of synonyms is given, with references to the literature and critical examination of the figures published by different authors; the history, habitat, admixtures and substitutions, chemical constituents and medical properties are described, with frequent references to the literature on these subjects. It seems somewhat strange that the author speaks of A. reticulata as "la fausse serpentaire;" but it is evident from the text that this term is used solely in distinction from the species yielding the drug originally introduced; for the fact is noted that, like the latter, it is officinal in the United States; also that it is almost exclusively met with in commerce, and that it is the only kind furnished by the wholesale druggists of France, while in that country the root of A. Serpentaria is met with only among the antiquated stock of old pharmacies, where it happens to be rarely used.

The critical care bestowed upon this monograph, which is evidenced upon every page, shows that with the author, who is director of the works on natural history in the école supérieure de pharmacie of Montpellier, it was a labor of love; and thus a very valuable work for the student of materia medica in general, and of pharmacognosy in special, has been produced.—Am. Jour. Pharm., 1892, 175, 176.

*Aristolochia Argentina.*—Dr. O. Hesse examined the root of this plant and obtained *aristin*, which forms shining gold-colored laminæ and flat needles; a fat acid esther in small white laminæ and a third amorphous principle for which he proposes the name *aristolochine.* Concerning the latter, he says "that name has already been applied by Chevallier to a bitter substance obtained from Aristolochia serpentaria, but it was obviously a mixture, the bitter taste of which was probably due to the presence of the base now described."—Pharm. Jour. and Trans., 1891, 551.

*Aristolochia Indica.*—W. Dymock and C. J. H. Warden have examined the roots and stems of this plant chemically, and found a principle reacting with alkaloidal reagents. Aristolochia indica is a scandent shrub, common in the thickets throughout the hotter parts of India. It is described in the Rája Nirghanta under the name of Rudrajata, "Rudra's locks." The plant, boiled in oil, is applied as a liniment to snake-bites, and a decoction is given internally. It is also used for other disorders. The drug, as found in the bazaars, consists of a single long stem, with the root attached, coiled up in circular bundles. All parts of the plant have an agreeable odor resembling that of fresh ginger.—Phar. Jour. and Trans., 1891, 245, 246.

*Aristolochine.*—This is the name given by J. Pohl to the active principle of the seeds of Aristolochia Clematitis and the roots of A. rotunda and A. longa. It is soluble in chloroform, ether, acetone, phenol, acetic anhy-

dride, aniline and alcohol; almost insoluble in cold water, slightly soluble in warm water; insoluble in petroleum-ether, benzol and carbon disulphide; alkalies and alkaline-earth hydrates dissolve it; from neutral or alkaline solutions it is precipitated by neutral and basic lead acetate, dialyzed iron, zinc sulphate, silver nitrate and a saturated solution of salt, but not by alum, copper sulphate and platinic chloride; it does not reduce Fehling's solution, and does not react with Millon's reagent. Its ultimate analysis, C 59.98, H 3.54, N 4.32, O 32.16, leads to the formula $C_{32}H_{22}N_2O_{13}$.—Am. Journ. Pharm., 1892, 83, from Apoth. Zeitg., 1891, 642. (See also an analysis of Aristolochia reticulata by J. A. Ferguson, Proceedings 1888, xxxvi, 313.)

### AROIDEÆ.

*Arisaema triphyllum, Torr.*—In a most interesting paper, entitled "Raphides, the Cause of the Acridity in Certain Plants," Dr. R. A. Weber has shown that the acridity of the Indian turnip and calla is due to the raphides of calcium oxalate only, and not to a volatile principle. The question as to the cause of the acridity of certain plants containing raphides and the non-acridity of others containing them in equal abundance, has been one which has called forth much discussion in the various scientific societies. Dr. Weber selected four plants containing raphides, two of which, the Colocasia and Indian turnip, were highly acrid, and two, the Fuchsia and Tradescantia, were perfectly bland to the taste. The crystals were all found to be calcium oxalate; they crystallized all in the same system. He then expressed the juice of calla and Indian turnip, extracted it with ether, and the clear filtered ether, entirely free from raphides, was found to have lost every trace of its acridity. He then examined the Fuchsia and Tradescantia in the same manner, and found that these plants contained a large amount of mucilage, in which the crystals are imbedded, and which prevents their free movement into the tongue and surface of the mouth when portions of the plant are tested.

The reason why the Indian turnip loses its acridity on being heated can be explained by the production of starch paste from the abundance of starch present in the bulbs. This starch paste would evidently act in a manner similar to the insoluble mucilage of the other two plants.

So also it can readily be seen that when the bulbs of the Indian turnip have been dried the crystals can no longer separate from the hard mass which surrounds them, and consequently can exert no irritant action when the dried bulbs are placed against the tongue.—Jour. Amer. Chem. Soc., 1891, p. 215; Am. Jour. Pharm., 1891, 544–546.

### ASCLEPIADACEÆ.

*Gonolobus Condurango, Triana.*—G. Carrara extracted the bark with strong alcohol, and allowed the filtered solution to cool. He obtained a greenish powder as a precipitate, leaving a yellowish-brown solution. This

solution has not yet been fully examined, but on treating the powder he obtained a glucoside ($C_{10}H_{14}O_6$), which melts at 112°, and is insoluble in ether and light petroleum, sparingly soluble in cold alcohol, and very slightly in water. When heated with benzoic chloride, it forms a benzoyl derivative. He also obtained a yellow powder showing the color reaction of chloresterol, but melting at 52°, and having the composition $C_{30}H_{50}O$; this compound the author names *conduransterin*.—Gazetta, 21, 204-212; Jour. Chem. Soc., 1891, 1387.

*The Condurangines.*—By M. H. Bocquillon. (Jour. de Pharm. et de Chem., 1891, 485-488).—The author considers the history, preparation, solubility, rotation, fusion point, coagulation, behavior with reagents, physical properties, and the distinctions between the five condurangines. He also describes a resinous residue as condurangetine.

*Gymnemic Acid.*—To isolate this acid the finely powdered plant (Gymnema silvestris) is moistened with a small quantity of 20 per cent. solution, allowed to stand 48 hours and extracted for 24 hours with benzin; the benzin is distilled off, the residue repeatedly washed with ether and dried. The impure acid so obtained forms a brownish crystalline powder, very soluble in alcohol, in 100 parts water, insoluble in ether, chloroform and carbon bisulphide; acids decompose it; it forms salts which are not soluble in water. In larger doses, 0.3–0.4, it is emetic; in very small quantities it is very effective in disguising bitter tasting medicines. For this purpose it is recommended to use an one-half per cent. aqueous solution, to which is added a small quantity of alcohol for rinsing the mouth before taking the medicine.—A. Quirini (Gyogysz. Hetilap.). Pharm. Ztg., 1891, 401; Am. Jour. Pharm., Aug. 1891, 409.

*Morrenia Brachystephana*, Griseb.—Messrs. Arata and Gelzer report the results of a chemical investigation of the milky juice contained in the fruit and rhizome of this plant, which is known by the natives of the Argentine Republic as "tasis." The rhizome contains an alkaloid, "morrenine," having an acrid odor and extremely bitter taste. Morrenine also was found in the fruit, as well as a crystalline body "morrenol," which is probably allied to it, but not identical with the asclepion of List and cynanchol of Butlerow. The juice is principally used as a galactagogue, and an observation by Prof. Arata seems to show that there is some foundation for its reputation in this direction.—Pharm. Jour. and Trans., 1891, 268.

## BERBERIDACEÆ.

*Alkaloids of Berberis Aquifolium and B. vulgaris.* By C. Rüdel (Arch. Pharm., 229, 631–666). The publications of Wacker, of Hesse, and of Stubbe, on the alkaloids of the roots of Berberis vulgaris, and those of Persoons (Abstr., 1882, 1140), of Jungk and of Stubbe on the alkaloids of the roots of Berberis aquifolium, show that each contains three

alkaloids, and that they are in all probability the same. The chemical formula and the exact description of the salts were not, however, very perfectly defined, and the author has endeavored to complete this part of the work.—Abstract in Jour. Chem. Soc., 1892, 641, 642.

*The Alkaloids of Berberis.* By Ernst Schmidt (Arch. d. Pharm., 228, 596–604). Berichte, 1892, 24, 83.

*Berberine and Hydroberberine.* By R. Gaze, H. Schreiber and Ch. Stubbe (Arch. d. Pharm., 228, 604-662). Berichte, 1892, 24, 83–85.

*Berberine—Preparation*—R. Gaze treats 50 gm. of berberine sulphate with 1000 gm. of water and 500 gm. of acetone in the presence of sodium hydrate. The acetone-berberine is then decomposed by heating with chloroform for twelve hours. Berberine thus obtained contains six molecules of water. Pure berberine salts may be obtained from acetone-berberine by heating it with the acid until completely dissolved.—Year-book, 1891, 56, from Chem. Centr., 1890, 590.

*Berberine.—Reactions.*—For the explanation of the Roman numerals see under Chemistry. M. P. about 140° C. $C_{20}H_{17}NO_4+4\frac{1}{2}H_2O$.

*a.* Soluble in water and alcohol, insoluble in ether, chloroform and carbon bisulphide; the solutions are all neutral.

*b.* An aqueous solution of berberine (1 to 300) is yellow. On adding one drop of the same to one drop of reagent XIII., the color is not changed; alkaline solutions, as lime water, etc., however, turn berberine solutions red.

*c.* 1 c.c. of reagent XV. mixed with 3 c.c. of the above aqueous solution of berberine, causes no change of color, but after a little while crystals of berberine nitrate will separate. By using 2 c.c. of the berberine solution, the crystals will again be formed, and with them a slight brownish red color will be developed. If finally, equal volumes of reagent XV. and berberine solution are mixed, a dark-red color will be produced without the separation of crystals.

*d.* The berberine solution is readily precipitated by reagents IV., IX., X., XVI., XVII., XVIII., XXI.

*e.* One drop of reagent XIII. mixed with one drop of the berberine solution, on the addition of a crystal of sodium nitrate or potassium bichromate, will cause violet streaks to form through the liquid, and these change finally to brown.

*f.* By heating 1 milligm. of berberine with 10 c.c. of water and 5 grammes of metallic zinc on a water-bath, with a little dilute sulphuric acid, the yellow color of the solution will disappear—this is due to the formation of hydro-berberine, $C_{20}H_{21}NO_4$. On addition of a few drops of this to some nitric acid, it will again turn yellow or yellowish red if the mixture be vigorously shaken.

*g.* By heating 1 milligm. of berberine, or a small quantity of any berbe-

rine yielding plant, with 4 c.c. of water and 1 c.c. of reagent XIII., and then adding to the hot mixture a few drops of chlorine water, a red zone will be formed in the liquid.—Pharm. Review, 1892, 7.

*Canadine—Constitution.*—In continuation of his previous researches (see Proceedings 1888, xxxvi., 563), Ernst Schmidt states that its formula is $C_{21}H_{21}NO_4$, and that it may be considered as dihydromethylberberine. According to Deichmann, canadine contains two methoxyl-groups, and is a tertiary base; in these respects resembling berberine.—Pharm. Post, 1891, 880.

*Podophyllum peltatum*—Linné. The results of the present investigation by R. Kürsten, supplement the work done by Podwyssotzki (1882). The podophyllotoxin prepared by Podwyssotzki's method was not constant in composition, and its melting point varied from 100° to 125°; further, the podophyllic acid of that author is composed mainly of a crystallizable, active, but very impure substance.

*Podophyllotoxin,* $C_{23}H_{24}O_9+2\ H_2O$, occurs in long, well formed prisms. It melts at 93°–95°, and at a higher temperature chars without subliming. 100 cc. of water at 15° dissolves 0.014 gram; hot water dissolves somewhat more. It is very slightly soluble in ether and cold benzene, easily soluble in acetone and strong alcohol, and with difficulty in concentrated acetic acid. When moistened with concentrated sulphuric acid, the crystals give an immediate cherry-red coloration, which slowly passes through greenish-blue to violet. Concentrated hydrochloric and nitric acids produce a red coloration; ferric chloride and bromine produce no change; the compound dissolved in glacial acetic acid gives a red coloration with Millon's reagent. The alcoholic solution is strongly lævorotatory. Zeisel's method indicates the presence of three methoxyl groups Hydroxyl does not appear to be present.

Podophyllotoxin, when oxidized, in an alkaline solution in the cold, by means of potassium permanganate, yields *podophyllic acid,* $C_{20}H_{24}O_9$, in well formed colorless crystals. It is without action on animals.

Podophyllotoxin by the action of alkalies yields *picropodophyllin,* which has the same composition as podophyllotoxin, but they differ in melting point—227° and 95°; in their action on polarized light—inactive, lævorotatory; as to solubility, the former is less soluble in all liquids than the latter; the latter gives Millon's reaction, the former does not. By oxidation and reduction the two compounds yield the same products. The residue of the chloroform extract, freed from crystalline podophyllotoxin, yielded a little picropodophyllic acid in crystals melting at 156–158°; no other definite substance could be obtained from the extract.

Podophylloquercetin, $C_{23}H_{16}O_{10}$, occurs in crystals which melt at 275°–277°. It is almost insoluble in water, sparingly soluble in cold glacial acetic acid, more soluble in the hot acid and in ether, easily soluble in

strong alcohol. It reduces alkaline copper solution, also ammoniacal silver solution. Probably this compound is not identical with quercetin.—Arch. Pharm., 1891, 229, 220–248; Jour. Chem. Soc., Sept., p. 1133. Am. Jour. Pharm., 1891, 485–487. Also Jour. Pharm. Chem., 1891, 255–258.

### BIXINEÆ.

*Annatto—Cultivation in Guadaloupe*—According to a consular report, annatto thrives at a high altitude, but yields less and less as the distance increases above 5,000 feet. It is not necessary to plough the land, but simply to dig holes in the ground (50–60 cm. in diameter and 30–40 cm. in depth), only a few seeds being laid in each hole, and only the strongest shoots are left to grow, the others being pulled up. The young plants require careful hoeing for nearly a year. Annatto bears twice a year, the spring blossoms always yielding a larger crop. As soon as the pods in the bunches commence drying and opening, the bunches are cut by means of a pair of shears or a crooked knife. These bunches are packed in baskets, and transported to the sheds for further manipulations. Every pod requires to be picked with the hands as much as possible, the seeds attached to the white film inside being left untouched. The pods, when empty, are used as manure. This work of picking is generally performed by women and children, who are paid at the rate of five centimes per kilo (about one cent for two pounds). The crop is gathered from the middle of July to the end of August, and it is estimated that one hectare (2.47 acres should yield on an average 1,500 kilos of green seeds for the two crops, or about 7 casks of pulp, weighing about 350 to 400 pounds each.—Drug. Circ., 1892, 8.

*Kiggelaria Africana—Hydrocyanic Acid.*—H. Wefers Bettink has obtained from 0.085 to 0.1125 per cent. of hydrocyanic acid by distilling the leaves with water; it appears, however, that the acid exists in a peculiar combination. The leaves do not contain any amygdalin, nor does the acid exist in the free state. The body which splits into hydrocyanic acid appears to be insoluble in cold alcohol, as the tincture on distillation with hydrochloric acid does not yield hydrocyanic acid.—Pharm. Zeitg., 1892, 135, from Niew Tijds., 1891, iii. 337.

*Oil of Chaulmoogra—In Leprosy.*—This oil, which has been extolled so highly in leprosy, gives encouraging results at first, but produces no lasting benefit, and is also attended with such grave physical inconveniences that no one has been able to persevere in its use. Tonics and astringents appear to be more promising.—Chem. and Drug., July 25, 1891, 154.

### BORAGINEÆ.

*The Active Principle of the Borragineæ.*—The roots, stems, leaves and seeds of *Heliotropium Europæum* and *Cynoglossum officinale* were exam-

ined. By hot extraction of the *roots* with petroleum-ether there was extracted, especially from the cynoglossum, a red coloring principle, which by spectroscopic examination was proven to be identical with the coloring matter from alkanna. By extracting the residue with alcohol and evaporating, a mixture of wax and alkaloid was obtained; the latter was separated by treatment with dilute sulphuric acid, and the solution supersaturated with ammonia yielded the alkaloid to chloroform. The roots after treatment with alcohol had lost all the bitter taste. The *stems* and *leaves* treated in the same manner failed to give indications of alkaloids. The *seeds* by the same treatment yielded the same alkaloid as the roots. The alkaloids extracted from the two plants are identical: it is hygroscopic; its salts are uncrystallizable and are readily decomposed at 100° C., and even at normal temperatures after some time. The alkaloid gives precipitates with the alkaloidal reagents; with concentrated sulphuric acid it becomes yellow, changing to a red; the addition of oxidizing agents does not produce characteristic colorations. Physiological experiments did not show the curarine-like effects, as has been announced by other investigators. The name *cynoglossine* is proposed to be retained for the alkaloid, no matter from which source it is obtained.—Prof. F. Schlagdenhauffen and E. Reeb, Pharm. Post, 1892, 1; Amer. Jour. Pharm., 1892, 140.

*Eritrichium gnaphalioides, D. C.*—Té de Burro. A description of the plant and its medicinal uses.—Phar. Jour. and Trans., 1892, 880.

### BROMELIACEÆ.

*Tillandsia usneoides*, Linné.—Long, black, or Spanish moss has been found useful by Dr. L. M. Tiffany, of Baltimore (Med. News, Dec., 1890), as a soft and elastic dressing for wounds. After it has been deprived of the softer portions of the tissue, the nearly black fibres are used for upholstering, and now recommended as a dressing for wounds.—Am. Jour. Pharm., July, 1891, 328.

### BURSERACEÆ.

*Icica heptaphylla*, Aubl.—By G. Johannson. (Diss. Dorpat, Oct., 1891.) The author has examined the bark microscopically. Th. Christy examined the tree chemically, and found it to contain a soft resin.—Pharm. Post, 1892, 111, 112.

### CACTACEÆ.

*Cactus grandiflorus*, L.—Mr. P. W. Williams, of Bristol, reports the stems and flowers to be useful in functional disorders of the heart, especially in the distressing palpitation arising from reflex irritation in dyspepsia.—Practitioner, 1891, 266; Phar. Jour. and Trans., 1891, 347.

*Cactina, Notes on.*—J. B. Nagelvoort claims that "to general methods of plant analysis, fluid extract Cereus grandiflorus did not yield an alkaloid."—Bulletin of Pharm., 1891, 354; 1892, 59, 60.

*Cactine and Cactus.* By Drs. E. Boinet and Teissier. (Bull. gén. de Thérap., Oct. 30, 1891.) Dr. O. M. Meyers. (N. Y. Med. Jour.)—Abstract in the Western Drug., 1892, 65.

*Cactine.—Uses.*—F. W. Sultan has isolated the active principle of Cactus grandiflorus, and its physiological action has been examined by O. M. Meyers, who states that, locally, it is absolutely non-irritant, and that in therapeutic doses it is a powerful cardiac tonic stimulant, useful in functional cardiac and circulatory disturbances and in organic heart disease, except mitral stenosis, for which digitalis is preferable.—Am. Jour. Pharm., 1891, 424, from N. Y. Med. Jour., June 13, 1891.

CANELLACEÆ.

*Oil of Canella.* Prof. Schmidt. (Monit. Scientif., Nov. 1891.)—Jour. Pharm. Chim., 1892, 67.

CAPRIFOLIACEÆ.

*Sambucus canadensis*, Linné.—Mr. Frank F. Lyons subjected this drug to a chemical examination with the following results: Ash, 6.67; volatile oil, 0.5; fat and a crystalline greenish-yellow wax; ether extractive, 3.13 per cent.; this was digested with acidulated water, and from which with chloroform he extracted an amorphous yellow compound, having the peculiar odor of the flowers and a very bitter taste. This chloroform extract when dissolved in water produced no change with iron salts, but did reduce Fehling's solution. Water extracted from the residual drug: Mucilage, 6.48; glucose, 5.76, saccharose, 1.60; and 2.30 per cent. of a peculiar substance resembling tannin. With sodium hydrate 5.40 per cent. of pectin and albuminoids were extracted.—Am. Jour. Pharm., 1892, 1–3.

*Elderberry Juice as an Indicator.*—By C. C. Hamilton (from Meyer Bros. Druggist.—Drug. Circ. and Chem. Gaz., 1891, 228.

*Triosteum perfoliatum*, Linné.—It has been variously known as Dr. Tinker's Weed, wild ipecac, horse gentian, wild coffee, and fever root. It is a mild cathartic, and in the fresh state possesses emetic properties. The plant is indigenous to Eastern U. S., and deserves a thorough chemical investigation.—Am. Jour. Pharm., July, 1891, p. 326.

*Viburnum prunifolium*, L.—*Synonyms:* V. pyrifolium, Poir.; V. pyrifolium, Poir., var ferrugineum, T. and G.—Black haw, Stagbush, Sheepberry, Nannyberry. Dr. H. H. Rusby calls attention to the botanical and medical history of this important drug. Two beautiful illustrations are given.—Bulletin of Pharm., 1891, 312–314.

CARYOPHYLLACEÆ.

*Lychnis Githago*, Lam. (*Agrostemma Githago*, L.)—Corn Cockle. By N. Kruskal and R. Kobert (Chem. Centr., 1891, ii., 545–546; Arb. Pharm. Inst., Dorpat, 6, 89–145, 146–148). The sapotoxin of Lychnis

has the same composition as those of radix saponariæ albæ and of quillaia bark, but differs from them in physiological properties.—Jour. Chem. Soc., 1892, 350.

CELASTRINEÆ.

*Celastrus scandens*, Linné. Mr. Jacob Hoch examined the root bark, which he collected in Montgomery County, Pennsylvania. He found no volatile constituents. The organic constituents determined were orange-red coloring matter, several resins, tannin, vegetable acid, glucose and starch. Mr. C. H. Bernhard made an analysis of Celastrus scandens which is recorded in the Am. Jour. Pharm., 1882, 1–5.—Am. Journ. Pharm., 1891, 523, 524.

*Celastrus edulis—The Physiological Effects of the Active Principle of.* —By Prof. Ugolino Mosso. (Abstract of an introductory lecture in the University of Genoa. Trans. for Med. Bull., from Archiv. Ital. di Clin. Med. for March 31, 1891.)—Western Drug., Oct. 1891, 369.

CISTACEÆ.

*Lechea major*, Michaux.—Under the name of "Flux weed," Prof. Maisch received this plant, which was stated to be used for complaints indicated by the common name. It has an astringent and somewhat bitter taste, and according to Dr. Carter, is reputed to be tonic, febrifuge and antiperiodic.—Am. Jour. Pharm., July 1891, p. 327.

COMBRETACEÆ.

*Combretum Raimbaultii.*—Dr. E. Heckel (*Répert. de Phar.*, June 10), describes the use of this plant in "bilious hematuric fever" as employed by the natives of Western Africa, between Rio-Numez and Sierra-Leone, under the name of ***kinkeliba***. They make a decoction of 16 gm. of the powdered leaves to 1 litre of water, boiling the mixture for 15 minutes and then filtering. One tumblerful (250 gm.) is given at once; half this quantity is given ten minutes afterward, and a quarter of it ten minutes later. Vomiting supervenes, but soon ceases and does not recur. The patient continues to take the decoction whenever he is thirsty, for four days; but he should not ingest more than 1½ litre daily. Kinkeliba contains tannin (20.80 gm. per 100 gm.), and a quantity (not stated) of nitrate of potassium. It acts as a tonic, diuretic and, at first, as an emetic. Cholagogue properties are attributed to it by the natives. Dr. Heckel found that it sometimes gave rise to a bilious diarrhœa.—Am. Jour. Pharm., Aug. 1891, 402.

COMPOSITÆ.

*Anthemis Cotula*, Linné.—In an analysis made upon the flowers of Mayweed, Mr. Wm. H. Haake found a reddish-brown volatile liquid alkaloid, with a characteristic odor and taste, and soluble in chloroform, ether, alco-

hol and water. When acidified, its aqueous solution produced a yellow precipitate with Mayer's reagent, a dark yellow with potassium tri-iodide, a reddish with tannin, and a reduction with auric chloride. He also found a volatile oil, resin, bitter principle, a small quantity of an organic acid, and valerianic acid, besides the usual plant constituents. The small amount of bitter principle possessed the properties of a glucoside.—Am. Journ. Pharm., Aug. 1891, 383–385.

*Oil of Arnica*—The oil from the flowers differs considerably from that of the root. The first has a sp. gr. of 0.900, at 25° C., and solidifies at 15°–20° C.; the latter oil is quite mobile and has a sp. gr. of 0.999 at 15°C. —Pharm. Centralh., 1891, 623, from Schimmel & Co.

*Artemisia Herba-Alba*, Ass.—The plant is extensively used in Algeria as a vermifuge under the name of "chili." M. Battandier has failed to obtain santonin from it, but obtained two uncrystallizable resins and a large quantity of essential oil. The species appears to be a very variable one, and the variety Sieberi, Besser, has been stated to yield Santonica. It is to this species (A. Herba-alba) that M. Battandier attributes the Barbary worm-seed formerly imported from Morocco.—Nouveaux Remèdes, 1891, 454; Pharm. Jour. and Trans., 1891, 347.

*Absinthiin.*—This was prepared from the ethereal extract by agitation with water, this solution purified by agitation with freshly precipitated aluminium hydrate, and extracting the bitter principle by agitation with ether, evaporating and drying over sulphuric acid; the aqueous solution can also be evaporated in vacuo. Absinthiin is amorphous, forming a pale-yellow powder of intensely bitter taste; it melts at 65° C., has the formula $C_{15}H_{20}O_4$, and is soluble in water, alcohol and ether. It is a glucoside, being decomposed by boiling with water and dilute acids into dextrose, a volatile constituent (volatile oil), and into a solid resinous substance belonging to the aromatic series, having probably the formula $C_{21}H_{16}O_6$, and reacting like an oxyacid.—O. Senger, Arch. der Pharm., 1892, 94; Am. Journ. Pharm., 1892, 311.

*Calendula officinalis.*—Maxwell J. Tielke states that this drug is used considerably in parts of our western country as a vulnerary.

The following percentages were found:

| | |
|---|---|
| Volatile oil | .02 |
| Fixed oil | 5.30 |
| Caoutchouc | 4.90 |
| Resin and coloring matter | 8.71 |
| Mucilage | 6.30 |
| Sugar | 11.82 |
| Albuminoids | 1.32 |
| Pararabin | .88 |
| Insoluble lignin, etc | 39.22 |
| Ash | 10.50 |
| Moisture | 6.75 |
| Undetermined and loss | 4.28 |
| | 100.00 |

The activity of the drug is probably due to the yellow resin dissolved by ether and alcohol. Tannin was not found, although the coloring matter was somewhat darkened by solution of ferric chloride.—Am. Jour. Pharm., 1891, 477.

*Centaurea Behen*, Linné—*Suffed Bahman.*—A new drug from the Persian Gulf region. An account of its history, habitat and properties.—Chem. Zeitung, 1892, 460.

*Chrysanthemum cinerariæfolium* (Visiani).—In a paper read before the Detroit Chemical Society, Nov. 10, 1891, Mr. F. A. Thompson reported an examination of seven samples of insect powder, representing six Eastern wholesale firms and one Western firm. The essential tests taken up by him were the color of powder, amount and constituents of ash, and behavior of the chloroform extract toward reagents. The practical tests as applied to insects being omitted for lack of time and insects.

The following is a recapitulation of analysis:

| Name. | Color. | Per cent. ash. | Constituents of ash. | Chloroform extract. | | | Adulteration. | Microscopical examination. |
|---|---|---|---|---|---|---|---|---|
| | | | | Color. | Boracic acid test for turmeric. | Hydrochloric acid added. | | |
| Dalmatian... | Fawn. | 6.5 | Normal. | Greenish brown. | Negative. | Slightly green. | None. | No foreign starches. |
| Dalmatian... (uncolored). | Yellowish brown. | 6.6 | " | Yellowish brown. | " | Distinctly green. | " | No foreign starches. |
| Dalmatian... | Light brown. | 6.59 | " | Brownish green. | " | Greenish. | " | No foreign starches. |
| Extra Dalmatian....... | Light yellowish brown. | 6.9 | " | Yellowish green. | " | Slightly green. | " | No foreign starches. |
| Dalmatian... | Light yellowish brown. | 6.2 | " | Greenish. | " | Deep green. | " | No foreign starches. |
| True I. powder........ | Deep yellow. | 12.6 | Normal and lead chromate. | Pale yellow. | " | Slightly green. | Chrome yellow about 6%. | No foreign starches. |
| Dalmatian... | Dark yellow. | 26.8 | Normal and lead chromate. | Greenish. | " | Distinctly green. | Chrome yellow about 20%. | No foreign starches. |

—Pharm. Record, 1891, 419.

*A New Alkaloid from Chrysanthemum Flowers.*—F. Marino Zuco has previously extracted from chrysanthemum flowers a new cholesterol, (Abstr., 1890, 757), a glucoside, and an alkaloid (Rend. Acad. Lincei, 6, ii, 572; 7, i, 121). He prepared the alkaloid in quantity. *Chrysanthemine*, $C_{14}H_{28}N_2O_3$, is a colorless syrup. On heating the alkaloid with an excess of methyl iodide, two methyl groups are taken up and it is partly converted into a new base in which both nitrogen atoms are combined with hydrogen. *Oxychrysanthemine* is prepared by oxidizing chrysanthemine with sodium hypobromite.—Gazzetta, 21, 516–554; Jour. Chem. Soc., 1892, 84–86.

*Chrysanthemum cinerariæfolium—Constituents of the Buds of.*—By H. Thoms (Chem. Centr., 1891, ii, 670–671; Pharm. Centralhalle, 32, 471, 472). Continuing his examination of the constituents of the buds of Chrysanthemum cinerariæfolium (see also Abstr., 1891, 333), the author describes one of the new compounds, pyrëthrosin, more fully. It is not a glucoside but more probably a phloroglucide.—Jour. Chem. Soc., 1892, 349, 350.

*Insect Flowers—Cultivation of.*—Drug. Circ. and Chem. Gaz., 1891, 184.

*Insect Powder—Substitute for.*—This is said to be found in Croton flavens, var. balsamifer, a plant growing in West Indies and South America. The leaves and young shoots are yellowish and downy, and the former when rubbed emit a peculiar fragrance, resembling that of sage.—Drug. Circ. and Chem. Gaz., 1891, 184.

*Examination of Insect Powder.*—By N. J. Nitzschmann.—Pharm. Era, Sept. 1891, 137.

*Insect Powder—The Constitution of.*—By Schlagdenhauffen and Reeb. (Jour. Pharm., Ells.-Lothr.) The authors have verified their former results as to the presence of a non-volatile poisonous organic acid, to which they gave the name of pyrethrotoxic acid, and for the isolation of which they describe an improved method. They have further detected a poisonous acid in the aqueous distillate, not yet examined, for which they suggest the provisional name chrysanthemic acid. From 25 kilos of the dried blossoms the authors obtained 3 grams of an odorous oil by distillation. Similar results were obtained with both varieties, the Dalmatian and Caucasian insect powder.

*Flores Chrysanthemi.*—A Contribution to the Microscopical Characters of. By Dr. T. F. Hanausek.—Pharm. Post, 1892, 18–24; 177–183.

*Eupatorium rotundifolium,* Linné.—Mr. Fred C. Shaw obtained from the flowering plant a bitter principle which responded to tests for a glucoside. The air-dry flowering plant was examined with the following results:

| | | |
|---|---|---|
| Moisture | | 8.40 |
| Ash | | 4.58 |
| Petroleum ether extracted, fat | 1.11 | |
| wax and caoutchouc | 2.81 | |
| | ——— | 3.92 |
| Stronger ether extracted resin and chlorophyll | | 2.40 |
| Absolute alcohol extracted resin and glucoside | | 2.77 |
| Water extracted mucilage | 0.96 | |
| Dextrin | 3.43 | |
| Glucose | 2.16 | |
| | ——— | 6.55 |
| Alkaline water extracted extractive | 3.65 | |
| Pectin and albuminoids | 3.20 | |
| | ——— | 6.85 |

| | | |
|---|---|---|
| Acidulated water extracted pararabin................ | 0.86 | |
| Calcium oxalate .................. | 2.04 | |
| | | 2.90 |
| Hot water extracted inulin......................... | | 0.89 |
| Chlorine water extracted lignin ..................... | | 3.70 |
| $HNO_3$ and $HKClO_3$ extracted incrusting matter....... | | 8.88 |
| Residue: Cellulose ............................... | | 48.16 |
| | | 100.00 |

—Amer. Jour. Pharm., 1892, 225, 226.

*Eupatorium purpureum*, Linné.—Analysis of this drug was made by G. Herbert Ray, Ph. G., and published in Am. Jour. of Pharm., 1890, p. 74. Said to be a sovereign cure for rheumatism. A compound of undoubted interest is Prof. Lloyd's "euparin" (ibid., p. 76), which crystallizes in handsome bright yellow needles, and is apt to be deposited from the fluid extract on standing. The aromatic properties so frequently encountered among the 560 known species of Eupatorium are wanting almost entirely in this drug.—Am. Jour. Pharm., July, 1891, p. 325.

*Eupatorin: The Active Principle of Eupatorium perfoliatum.*—C. H. Shamel (Am. Chem. Jour.. 1892, 224–225). The author obtained from the dried Eupatorium perfoliatum, gathered at blooming-time, the active principle in an amorphous and crystalline form. It was insoluble in water, in concentrated sulphuric acid, and in concentrated hydrochloric acid, but was soluble in even dilute nitric acid with a light-brown coloration. The nitric acid solution, when allowed to evaporate spontaneously or in a vacuum over lime, crystallizes in beautiful prisms and six-sided plates.

The solution of the nitrate of eupatorin gave with phosphomolybdic acid, a green color; picric acid, a few needle shaped crystals; auric chloride, colored slightly. The principle is soluble in the alkalies. The solution in sodium hydroxide gave the following reactions, parallel tests being made with the sodium hydroxide solution alone: Phosphomolybdic acid, an instantaneous brilliant green coloration which soon fades; auric chloride, a black flocculent precipitate; picric acid, a deep red coloration. The ultimate analysis of the crystallized nitrate deprived of its water of crystallization gave figures which would indicate that the formula is $C_{20}H_{25}O_{20}$-$HNO_3$.

*Haplopappus Baylahuen.—C. Gay.*—(Hysterionica Baylahuen (Gay) Baillon.) This plant, indigenous to Chili, has been used by the peasants in the diseases of women and to cure ulcers of horses and other animals. Dr. Baillé found an oil and resin which possessed the odor and taste of the plant, to which he ascribed the medicinal properties. Dr. Cervello found the infusion to be an excellent anti-diarrhœic, and secured beneficial results in the treatment of malarial and chronic dysentery. It is valuable in diseases of the respiratory apparatus, also as applied to the genito-urinary apparatus, and in the treatment of ulcers; with collodion

gives an antiseptic covering. Mr. Harry Kahn, Phar. M., in an analysis of the plant, secured, by careful manipulations, the resin in four distinct physical characters, which showed by their reactions with the following reagents that they were different:

| Reagents. | Alpha. | Beta. | Gamma. | Delta. |
|---|---|---|---|---|
| Sulphuric acid. | Seal brown with green edge. | Reddish-brown with green edge. | Crimson. | Red with light-green edge. |
| Fuming Nitric Acid. | Very light yellowish brown. | Reddish-yellow with green edge. | Very light yellow solution. | Reddish-yellow with $\beta$ with greenish edge. |
| Sulphuric acid and sugar. | Yellowish-brown with green edge. | | Dark red with purple edge. | Dark-red. |
| Froehde's reagent, | Brown with green edge after standing. | Dark brown with emerald green edge. | Dark brown, with blue edge. | Dark-brown with blue edge. |

The following is a summary of the analysis of the drug:

| | Per cent. |
|---|---|
| Moisture, I. | 2.11 |
| Ash, II | 12.67 |
| Volatile oil, III. (a) | 6.65 |
| Resin, III (b), IV. (b), V. (b) | 21.15 |
| Organic acids (Tannin, etc.) V. (a), VI. (c) | 2.55 |
| Mucilage VI. (a) | 1.46 |
| Dextrin, VI. (b) | 2.62 |
| Albuminoids, coloring matter, etc., VI. (d) | 3.47 |
| NaOH extract not ppt. by alcohol, VII. (b) | 2.22 |
| NaOH extract ppt. by alcohol, VII. (a) | 1.42 |
| Calcium oxalate, VIII. (b) | 1.43 |
| Pararabin, VIII. (a) | 3.40 |
| Cellulose, Lignin, etc., IX | 37.52 |
| Loss | 1.33 |
| Total | 100.00 |

—Am. Jour. Pharm., Aug. 1891, 377–383.

*Helenin* is stated to be a very valuable remedy in certain forms of leucorrhœa, being given in daily doses of 0.05 gm. Occasionally colic and diarrhœa are observed, but no other ill effects.—Journ. de Médecine; Am. Journ. Pharm., 1892, 138.

*Helenin* has been for some time before the medical public as a remedy in phthisis, but without any apparent progress in its use. According to Dr. T. J. Bokenham (British Med. Journ., 1891, 838), it would appear that the crystalline bodies occurring in Inula Helenium are difficult to separate on a large scale, and that consequently alantic anhydride was the only substance procurable commercially for his experiments. The effect of the administration of the alantic anhydride appeared to be to prolong life for a time, but not to prevent a fatal result.—Pharm. Journ. and Trans., 1891, 347.

*Helianthus annuus.*—Linné. "Sun-flower growing in Eastern Europe." It is an important economic product in Southern Russia. The oil is used instead of olive oil for domestic purposes; the pressed seeds and the boiled leaves (the latter mixed with clay) serve as cattle food, the stalks as fuel; and the plant moreover possesses the property of drying marshy soil. The cultivation is extending to southern Hungary.—National Druggist; Pharm. Journ. and Trans., 1892, 831.

*Hieracium Scouleri*, Hooker.—This plant, when fresh, is bruised, steeped in milk, the liquid strained, and given in large quantities is reported as an alexipharmic by Mr. F. D. Kelsey, of Helena, Mon. (Botan. Gazette, 1890, p. 237), upon the testimony of a clergyman.—Am. Jour. Pharm., July 1891, p. 325.

*Lactuca sativa*, Linné.—"The Existence of a Mydriatic Alkaloid in Lettuce." This is the substance of a communication made to the Chemical Society by T. S. Dymond. He examined the extracts prepared from a number of different sources of Lactuca, gathered when in flower. The results indicate that both wild and cultivated varieties of lettuce, especially when the flowering stage is reached, contain hyoscyamine, the mydriatic alkaloid occurring in *Hyoscyamus niger*, *Atropa Belladonna*, and other plants belonging to the natural order *Solanaceæ*, and it is probable that to the presence of this alkaloid the sedative and anodyne properties of extract of lettuce are due.

He also found that lactucarium of both English and German manufacture was devoid of mydriatic properties and contained no alkaloid whatever.

The fact that lettuce contains a poisonous alkaloid is not of great importance in connection with its use as a vegetable, since it is only used for this purpose in the early stages of its growth, before the bitter milk has been produced, when the hyoscyamine is only present, if at all, in minute quantities. The amount of mydriatic alkaloid in the extract prepared from garden lettuce when in flower is not more than .02 per cent. This is the first occasion on which hyoscyamine has been found in plants not belonging to the natural order Solanaceæ.—Pharm. Jour. and Trans., 1891, 449.

*Olearia argophylla*, F. M., found in Tasmania and Australia, is a small tree, the wood of which has a very pleasant, musky fragrance, and is of a brown mottled color, which well adapts it to cabinet work.—Chem. Drug., Aug. 1891, 221.

*Senecio (Cineraria) maritima for Cataract.*—By Dr. Mercer. (From Notes on New Remedies.) Western Drug., 1891, 447.

*Santonin—Manufacture in Turkestan.*—The lower prices of late years are chiefly due to the erection of a factory in Tschemkend, Turkestan, which in favorable seasons can be supplied with over one million kilos. of Levant wormseed. The wormseed is first treated with milk of lime, the calcium santonate is next treated with carbonic acid and soda, and the sodium santonate decomposed with sulphuric acid. The crude santonin is then obtained from the acid liquid by refrigeration, when it crystallizes out. The soda employed is obtained from the Kirghis by incineration of the plants of the steppes. The yearly production of santonin amounts to 32,000 kilos., which certainly is in excess of the demand.—Apoth. Zeitg. (Rep.), 1892, 20, from Journ. Pharm. Chim., 1891, xxiv., 251.

*Santonin—Estimation.*—According to M. H. Manseau, santonin is best estimated by mixing the finely powdered santonica with slaked lime, exhausting with alcohol, and, after distilling off the alcohol, neutralizing the residue with hydrochloric acid. The resinous mass, dissolved in dilute alcohol, is heated for one hour at 60° to 70° C. with an excess of plumbic acetate. The precipitate is filtered off, dissolved in hot alcohol, and freed from lead by treating with sodium carbonate; the alcohol is evaporated, and the residue again neutralized with hydrochloric acid; the precipitate is weighed.—Apoth. Zeitg. (Rep.), 1891, 91, from Rép. Pharm., 1891.

*Santonin—Reaction.*—The usual test of identity with sulphuric acid and ferric chloride is best applied as follows: Dissolve 0.1 gm. of santonin in 1 c.c. of sulphuric acid (in a dry test tube), pour cautiously on top of the solution 1 c.c. of water, and allow a very small drop of ferric chloride solution to run down the side of the tube. As soon as the drop touches the water, the tube is shaken vigorously, a red color changing to violet will appear. Too much of the ferric chloride will cause a separation of resin and a discoloration.—Pharm. Centralhalle, 1891, 438; from Südd. Apoth. Zeitg.

*Santoninoxime.*—This compound, $C_{15}H_{18}O_2N.OH$, has of late again been recommended as a vermifuge. P. Gucci prepares it as follows: Boil a mixture of 5 parts of santonin, 4 parts of hydroxylamine hydrochlorate, 50 parts of alcohol, and 3 to 4 parts of calcium carbonate for 6 to 7 hours on a water-bath, and add an excess of boiling water to the clear solution. The yield is 80 per cent. of the santonin employed. It crystallizes from alcohol in white, lustrous needles, which melt at 216–219° C., dissolves readily in alcohol and ether, but only very sparingly in

boiling water. In hot solutions of alkaline hydrates and carbonates, it dissolves, being precipitated unchanged on the addition of an acid. On being warmed with very dilute hydrochloric acid, the santonin is quantitatively reproduced. It is lævo-rotatory, the crude being $[a]_D =$ — 82.47, and the pure $[a]_D =$ — 80.83. It can be borne in two or three times larger doses than santonin.—Year-book Pharm., 1891, 66, from Gazz. Chim. Ital., xix., 367–382.

*Santoninoxime as an anthelmintic* is recommended by Coppola (Union Méd.), who regards it as a safe and reliable substitute for santonin, requiring doses about three times as large as those of the latter, the administration, however, not being followed by unpleasant effects.

Santoninoxime, $C_{15}H_{19}NO_3$, was prepared in 1889 by P. Gucci (Gazz. Chim., xix., 367), by digesting near 80° C. for 3 or 4 days 5 p. santonin, 4 p. hydroxylamine hydrochloride, 50 p. strong alcohol, and 4 p. precipitated calcium carbonate. It crystallizes in white silky needles, melts at about 217° C., is very slightly soluble in hot water, and turns polarized light to the left $[a]_D =$ — 80.83.—Am. Journ. Pharm., 1892, 193.

*Detection and Estimation of Santonin.* - By M. H. Manseau (Chem. Centr., 1891, ii., 733, 734; from Rep. de Pharm., 1891, Nos. 1 and 2). Being an estimation in urine, in the seeds and in pills. The author's results are not quite exact.—Abstr. in Jour. Chem. Soc.. 1892, 666.

*Santonin—A Derivative of.*—By P. Gucci and G. Grassi-Cristaldi (Atti d. R. Acc. d. Lincei, Rudet., 1891, ii., Sem., 35–40).—Berichte, 1892, 25, 908–910.

*Taraxacum officinale*, Linné.—Mr. Louis Koch examined two samples of dandelion root, one as he found it in commerce and the other collected by himself in March at Leetonia, Ohio. The commercial sample yielded 15.60 per cent., and the other 5.20 per cent. inulin. The following is the result of his analysis:

| | Per cent. |
|---|---|
| Moisture | 7.95 |
| Ash | 22.50 |
| Volatile matter at 110° | .02 |
| Fat | .44 |
| Wax | .09 |
| Caoutchouc | .10 |
| Resin soluble in ether | .35 |
| Resin insoluble in ether | .22 |
| Mucilage | 8.49 |
| Saccharose | 1.08 |
| Glucose | .46 |
| Albuminoids | 4.89 |

—Am. Journ. Pharm., 1892, 65.

CONIFERÆ.

*Oil of Cypress.*—Bravo recommends the oil of Cupressus sempervirens, L., as inhalation for whooping-cough. A few drops are sprinkled about the clothes of the child, so that it is continually surrounded by an atmosphere of the oil.—Pharm. Centralh., 1892, 128, from Deutsche Med. Zeitg.

*Dammar.*—By Dr. Carl Müller. (Pharm. Centh., 1891, 660.) A discussion of the plants yielding dammar.—Pharm. Post, 1891, 1003; also Ber. d. Pharm. Ges., 1891, 363-382.

*Larch Turpentine.*—By E. Valenta. Centr. Organ f. Waarenkunde und Tech., 1891, 1, 141; Jour. Soc. of Chem. Indus., 1892, 177.

*Turpentine Oils—The Nature of.*—By Henry E. Armstrong. (Jour. Chem. Soc.) Drug. Circ. and Chem. Gaz., 1891, 174, 175.

*On the Testing of Oil of Turpentine.*—By G. Vulpius. Apoth. Zeit., 1891, 6, 289; Jour. Soc. Chem. Indus., 1891, 800.

*Oil of Turpentine.*—R. G. Dunwody finds very considerable variations in the specific rotatory power and the specific gravity in different samples of the oil. In twelve samples the rotatory power varied from 2.60° to 36.64° in a 200 mm. tube before rectification, and from 3.90° to 38.62° after rectification. The specific gravity varied from 0.856 to 0.876 before, and from 0.851 to 0.873 after rectification. The oils commenced to boil at 155°–159° C., and the last portion distilled between 165° and 170° C.; the principal part distilled at 160°–162° C.

From the original "gum" the author has separated with petroleum ether (boil. point 25° to 45° C.) abietic acid, and with petroleum ether (boil. point 45° to 75° C.) a new substance containing 72–72.8 per cent. of carbon, 9.50–9.75 per cent. of hydrogen, and 17.70–18.25 per cent. of oxygen, and melting at 125°–126° C.—Am. Jour. Pharm., 1890, 284, 289.

*Oil of Turpentine—Estimation in Paints*, etc.—When paints or varnishes are distilled in air, it is known that oxidation products are formed giving a low result for turpentine, while the residue of linseed oil is rendered useless for further examination. H. J. Phillips recommends to carry on the distillation in a gentle current of illuminating gas. (To the apparatus is attached a thermometer, and a small tube is provided through which the gas is allowed to escape. The apparatus, which may be readily constructed from the illustration, is figured in the journals quoted.—Am. Drug., 1891, Aug., 251, from Chem. News.

*Oil of Turpentine.*—Raoul Varet finds that aluminum chloride polymerizes oil of turpentine with the formation at the same time of cymine, colophine and other carbides, though in smaller quantities.—Chem. News, July 31, 1891, 61, from Bull. Soc. Chimique, V., No. 12.

*Oil of Turpentine—Change on Keeping.*—J. E. Marsh and J. A. Gardner have found that "australene" (Berthelot's term for English oil of turpentine, to distinguish it from French, which he terms "terebentene") by the mere exposure to moist air and light, showed increase of rotatory power. A specimen of australene, which had been distilled, gave a rotation of + 19° 49′, and readily furnished, when treated with hydrogen chloride, crystals of solid hydrochloride. After standing for some months, the rotation was increased to + 21° 10′, and it now gave no crystals when hydrogen chloride was passed through it. On distilling it, and collecting in fractions, the rotation was found to be + 28°. "Terebentene" appears to show a similar increase. They also observed (which is not new) that the rotatory power decreases as the boiling point rises—the fraction of australene, boiling at 155°–157° C. had the rotation + 24° 56′, while that boiling at 167°–169° C. had only + 2° 10′.

*Action of Hydrogen Chloride.*—To all outward appearance it has exactly the same action on australene as on terebentene, but on closer study it is found that while hydrogen chloride decreases the original dextrorotation of australene, it increases the original lævorotation of terebentene. The authors also combat the opinion of Wallach that the liquid hydrochloride is a mixture of the crystalline substance with dipentene dihydrochloride.—Jour. Chem. Soc., Sept. 1891, 725–730.

*Oil of Turpentine—Detection of Resin Oil.*—A drop of the suspected oil is placed on a thin slip of unsized paper, and allowed to evaporate spontaneously. After one or two hours, the liquid has disappeared entirely without leaving a sensible stain if pure; in the presence of resin oil, a distinct oily stain is left. E. Baudin states that with 5 per cent. impurity no mistake is possible. In doubtful cases, 30 drops are evaporated to 6–8 drops.—Jour. Chem. Soc., July, 1891, 870; from J. Pharm. (5), xxiii., 279.

*Detection of Rosin Oil in Oil of Turpentine.*—By E. Baudin.—J. Pharm. Chim., 1891, 23, 279; Jour. Soc. Chem. Indus., 1891, 800.

*Oil of Resin in Turpentine.*—Zune points out that it is easy by the use of the refractrometer to discover the presence of four per cent. or less of resin oil in oil of turpentine, and that it is not difficult to detect even one per cent.—Comptes rendus, cxiv., 490; Phar. Jour. and Trans., 1892, 817.

*Oil of Turpentine—Action of Benzoic Acid upon.*—By G. Bouchardat and J. Lafont.—Jour. Pharm.--Chim., 1892, 5–8.

*The Action of Benzoic Acid upon Oil of Turpentine.*—By G. Bouchardat and J. Lafont (Compt. rend., 113, 551–553).—Berichte, 1892, 25, 904, 905.

*Reaction of Oil of Turpentine with Manganous Salts.*—Commercial oil of turpentine on being agitated with an ammoniacal solution of a manganous

salt acquires a blackish-brown color; the reaction is facilitated by the application of heat. L. Crismer (Bull. Soc. Chim. [3] vi., 25,) ascertained that this reaction depends not only upon the presence of hydrogen dioxide, but likewise of a small quantity of a water-insoluble acid, which was produced by the prolonged influence of air upon the oil. The same reaction takes place with pure oil of turpentine by adding to it a little oleic acid, followed by the manganous solution, and agitating the mixture with air. *Oil of lemon* shows a similar behavior. On distilling the brown oil in vacuo a resinous residue is left, soluble in chloroform, and containing manganese and formic acid, the latter apparently produced by the oxidation of the terpene. This behavior may be used for the detection of oil of turpentine in various mixtures. - Am. Jour. Pharm., 1892, 30.

*Studies of the Terpenes and Allied Compounds—The Nature of Turpentine Oils, Including that Obtained from Pinus Khasyana.*—By H. E. Armstrong and W. J. Pope.—Jour. Chem. Soc., 343, 1891, 311–320; Jour. Soc. of Chem. Indus., 1891, 653–655.

*The Dextrorotatory Terpene from the Needles of the Siberian Cedar* (Pinus Cembra, L.).—By F. Flawitzky (Jour. f. prakt. Chem., 45, 115–123). —Berichte, 1892, 25, 377.

*Terebene—Test for Age (freshness).*—H. Wyatt, Jr., gives the following easily applied test: Add 15 minims of the terebene to an ounce of the following mixture by means of a pipette pushed well down below the surface of the test solution, which should be in a stoppered bottle, so as to allow of shaking.

| | |
|---|---|
| Potassium iodide | 20 grains. |
| Compound powder of tragacanth | 00 grains. |
| Boiling water to | 8 ozs. |

Allow to cool before using.

If a blue color is produced before one hour, the sample of terebene is very bad. Good terebene shows no color before twelve hours, and after twenty-four hours only a pinkish-blue; rectified oil of turpentine develops soon a blue color, blue-black in twelve hours, and darker still in twenty-four hours.—Chem. Drug., May 1892, 774.

*Terebenthene—The Action of Aluminium Chloride and of Bromine.*—By R. Varet, Jour. Chem. Soc., Sept. 1891, 1084, from Comptes rendus, cxii., 732.

*Terpineol.*—This substance which lately has been made use of in perfumery to imitate the odor of hyacinth and of elderflower (according to the degree of dilution), is a dipentenyl alcohol which is obtained by allowing a mixture of French oil of turpentine and alcohol or concentrated sulphuric acid to stand for 12 days, and then fractionating the product, or by boiling terpin hydrate with phosphoric acid. Terpineol is a colorless,

thick, optically inactive liquid of an agreeable hyacinth-like odor, and a bitter, faintly burning taste. The specific gravity is 0.940 at 15° C., and 0.935 at 20° C. It congeals to a crystalline mass on freezing, and on dropping a crystal into pure terpineol, the latter consolidates at ordinary temperature, melting at 31°–32° C. It boils at between 215°–218° C. On dissolving one drop of terpineol in 1 c.c. of absolute alcohol, and cautiously adding 1 c.c. of sulphuric acid so as to form two layers, the line of contact will be of an orange-yellow color, a white turbidity appearing above; on agitation, a pink coloration appears.—Pharm. Post, 1891, 1066.

*Terpenes from the Resin of Pinus Abies.*—By B. Kuriloff (J. pr. Chem. (2), 45, 123–133.—From the author's results it is concluded that the oil from Pinus abies contains inactive terpene and lævorotatory isoterpene, together with substances containing oxygen which were not examined.—Jour. Chem. Soc., 1892, 625, 626.

*The Recovery of Camphor from Oil of Turpentine.*—By J. E. Marsh and R. Stockdale (Chem. Soc., 1890, 1, 961–965).—Berichte, 1891, 24, 155.

*Turpentine Distilling in Mississippi.*—By R. S. Cross (New Orleans Picayune). An illustrated and popular account of the turpentine industry in the South.—Pharm. Era, March 1892, 166–168.

*Turpentine Distilling in Missouri.*—An interesting description of this industry as carried on in Missouri, will be found in Pharm. Era, 1892, 166.

*Pine Tree Sugar.*—By Harvey W. Wiley.—Jour. Am. Chem. Soc., 1891, 228–237.

*A Contribution to the Chemistry of the Pollen from Pinus sylvestris.*—By Karl Kresling (Arch. d. Pharm., 229, 389–425.)—Berichte, 1892, 24, 959, 960, also Jour. Pharm. Chem., 1892, 311, 312.

*Pinus sylvestris—Analysis of Pollen.*—Karl Kresling has published a very thorough study of the chemistry of the pollen, of which the following is the condensed result:

The pollen contains 3 per cent. of ash, rich in potassium and phosphoric acid; 11–12 per cent. of fat, melting at 40° C.; 0.89 per cent. of lecithin; 12.75 per cent. of cane sugar; and 7.4 per cent. of starch. The nitrogenous constituents are globulin, nucleines, pepton, albumins, ammonia and substituted ammonias. The peculiar fat contains 5.24 per cent. of glycerin, 6.16 per cent. of unsaponifiable constituents (cholesterin and myricyl alcohol); and 87.85 per cent. of fatty acids. Nearly 75 per cent. of the latter consists of oleic acid, the remainder is chiefly palmitic and a little cerotic acid. Butyric acid is the only volatile fatty acid the presence of which could be ascertained.—Chem. Zeitg. (Rep.), 1891, 257, from Archiv Pharm., 1891, ccxxix., 389–425.

*Spruce Gum.*—(From Confect. Journal.)—An account of the habitat of the tree yielding spruce gum, and of the collection and preparation of the latter.—Pharm. Era, April 1892, 198.

*Rosin.*—H. Beckurts and W. Brueche found the spec. grav. from 1.068 to 1.081; acid number from 173 to 186; ester number from nothing to 12: saponification number from 179 to 192; and iodine number from 109 to 121.—Archiv Pharm., 1892, ccxxx., 87.

*Rosin.*—Dieterich received six lots with acid numbers 164.3 for the lowest and 176.7 for the highest: and a specific gravity ranging from 1.75 to 1.082.—Apoth.-Zeitg. (Rep.), 1891, 90.

*Rosin—Estimation in Mixtures with Fatty Acids.*—E. Twitchell estimates the rosin by dissolving the mixture in ten times its volume of absolute alcohol, and passing a moderately strong current of dry hydrochloric acid gas through it, the flask containing the mixture being cooled with water. After 45 minutes the reaction is finished, and the esters float on top; after half an hour the mixture is diluted with five times its volume of water, and heated to boiling until the acid solution is clear. After the addition of a little gasolin (boil. point 74° C.), it is transferred to a separatory funnel and the flask washed with sufficient gasolin to bring the volume of the separated gasolin solution to 50 c.c. The latter is washed with water, and treated in the separatory funnel with a solution of 0.5 gm. of potassa in 5 c.c. of alcohol and 50 c.c. of water, which will saponify the rosin. The separated solution of rosin-soap is decomposed by hydrochloric acid, the rosin collected, dried, and weighed.—Chem. Zeitg. (Rep.), 1891, 228, from Journ. anal. applied Chem., 1891, 379; Am. Drug., 1891, 351.

——— J. Arthur Wilson fully endorses Twitchell's method, but states that it can be shortened by leaving out the washing, and dissolving in alcohol direct. A few drops of methyl orange are then added, and alkali till neutral to this indicator; phenolphthalein is then added, and the tritration completed as before. The alkali required in the first case is for the neutralization of the free hydrochloric acid, and is of course neglected. That required to neutralize to phenolphthalein is of course due to the rosin, and is calculated as such.—Chem. News, 1891, lxiv., 204.

*Rosin—Estimation in Soaps, etc.*—V. Boulez dissolves 5 gm. of the soap in 200 gm. of boiling water, and precipitates with nitrate of silver. The water is evaporated, the precipitate dried completely, and the silver resinate extracted with ether. After filtering, the resinate is decomposed by hydrochloric acid; the filtrate is heated to evaporate the ether, and weighed. The result is checked by titration with soda, 1 gm. rosin requiring 0.122 gm. of soda.—Chem. Zeitg. (Rep.), 1891, 343; from Soc. Chim. du Nord.

*Retinol—Uses.*—F. J. Vigner recommends it in the treatment of skin diseases. It dissolves many antiseptics: salol, 1–10; iodol, 1–50; naphthol, 1–50; aristol, 1–50; camphor, 1–20; chrysophanic acid, 1–40; cocaine, 1–30; codeine, 1–40. It mixes with fats, oils, petrolatum, lard, lanolin, and glycerin. Combinations of convenient density are: Retinol 10, white wax 4, cacao butter 6 parts; retinol 8, resin 8, lanolin 5 parts; or of each 5 parts.—Am. Journ. Pharm., Aug., 1891, 424; from Brit. J. Dermatology, May 1891.

*Venice Turpentine.*—H. Beckurts and W. Brueche found the specific gravity at 15° C. from 1.060 to 1.190; acid number from 76 to 101 (Kremel found 68 to 70.3); ester number from nothing to 6; saponification number from 81 to 101; and the iodine number from 137 to 149.—Archiv Pharm., 1892, ccxxx., 83.

*Forest-Wool (Waldwolle).*—F. v. Hoehnel, after stating that the fibres of the leaves ("needles") of Pinus sylvestris are too coarse, short, inelastic, and quite brittle, to be woven without the addition of cotton or wool, calls attention to the pines of the United States, especially yellow pitch pine (Pinus australis, Michx.) and Loblolly pine (Pinus Taeda, L.). The leaf fibres of these pines are dark brown, 25 cm. in length, elastic, and perfectly well fit for weaving and upholstering; an additional advantage is that the fibres can be easily separated from the epidermis.—Zeits. Oesterr. Apoth.-Ver., July 1891, 1343.

### CONNARACEÆ.

*Cangoura—Contribution to the Study of.*—A new convulsive poison from San Salvador. The Cangoura is a large liana or tropical climbing plant, evergreen and woody, which grows on the banks of streams in the warm and humid forests of Salvador. It serves to poison dangerous animals. Three circumstances attract especial attention to the mode of action of this new poison: (1) the relatively great length of time which elapses between the moment of its introduction into the organism and that of the first symptoms of poisoning (with a moderate dose it is three days); (2), the strangeness of its action upon all display of nervous activity, and especially the cerebral disturbances it provokes (the animal appears a prey to furious madness); (3) the total duration of the nervous phenomena (about twenty days).—Carlos Benson, in Les Nouveaux Remèdes, April 24, 1891; Pharm. Jour. and Trans., 1892, 982, 983.

### CONVOLVULACEÆ.

*Ipomœa hederacea,* Jacq. (Kálá dáinah.) An interesting and illustrated account of the history and character of the new drug.—Chem. Zeitung, 1892, 79, 80; 421, 422.

*Proportion of Resin Contained in Jalap.*—By Th. Waage. (Ber. d. D.

Pharm. Ges., p. 87, 1891, from Rep. der Pharmacie, ii, p. 79, 1891.)—Jour. Pharm. Chim., 1891, 297, 298.

*Jalapa.*—By H. H. Hoffman. (Pharm. Era, July 9, 1891.) A description of the plant, tuberous root and substitutions.

*Scammony—Production of, in Asiatic Turkey.*—(Jour. of the Soc. of Arts, after Monit. Scientif., Oct. 1891.)—Jour. Pharm. Chim., 1892, 71, 72.

*Commercial Resin of Scammony.*—The conclusions reached by Walter H. Umstead are that a resin of scammony may be obtained in this market which meets all the tests of the Pharmacopœia, but that most of that used does not fully comply with the requirements of our national standard. In two samples the reaction for colophony was immediately obtained. They likewise were not wholly soluble in ether; 5 per cent. of one and 12 per cent. of the other were found to be insoluble.—Am. Jour. Pharm., 1892, 122, 123.

CRUCIFERÆ.

*Mustard—Test for Presence of Fixed Oil.*—In order to make a good mustard paper it is absolutely necessary that all the oil is removed. Dieterich gives the following test for its absence: Boil 1 gm. of the mustard with 10 c.c. of petroleum ether in a test tube of 20 mm. in diameter for half a minute. The presence of even very small quantities of the fixed oil is indicated by a yellow color of the supernatant ether.—Pharm. Post, 1891, 469.

——— *Test for Quality.*—Crouzel recommends to extract the fixed oil with ether, mix the residue with water, and allow to stand for 24 hours. The essential oil formed is extracted with ether, which solution is separated and evaporated at 0° C. The essential oil must amount to about 0.3 per cent. of the mustard.—D. A. Apoth. Zeitg., xii., 59; from L'Union Pharm.

*Myrosin.*—Dr. Schlicht, in making determinations of myronate of potassium in rape-seed oil-cake, noticed that the development of oil of mustard notably increased if the water used in the maceration of the oil-cake was slightly acidified with tartaric acid; an excess of tartaric acid diminished or prevented the formation of oil of mustard. Experiments with isolated myrosin lead to the conclusion that this is a mixture, since its aqueous solution with small quantities of tartaric acid forms a very heavy, curdy precipitate, which was insoluble in water, and had no action upon myronate of potassium, while the filtrate from this precipitate retained its full power of decomposing myronate of potassium. As yet it has not been possible to produce the ferment in the pure state.—Pharm. Ztg., 1892, 232; Am. Jour. Pharm., 232–233.

*Potassium Myronate.*—P. Birkenwald has prepared potassium myronate from the seeds of Brassica nigra and Sinapis juncea by Will and Koerner's method; both specimens melted at 135° C., and decomposed at 145° C.

The loss on heating at 100° C. during four hours amounted to 2.43 per cent. in the case of the specimen from B. nigra, and to 3.32 per cent. in that of the specimen from S. juncea. The loss on heating should have been 4.3 per cent. to correspond with 1 mol. $H_2O$.—Year-book Pharm., 1891, 86; from Pharm. Zeits. Russl., xxix., 785–787.

*Essential Oil of Mustard.*—By P. Birkenwald (Chem. Centr., 1891, 1, 266, 267; from Pharm. Zeit. Russ., 29, 785–787). On a copper compound of Allyl Thiocarbimide and Potassium Myronate. The latter he prepared from the seeds of Brassica nigra and Sinapis juncea.—Jour. Chem. Soc., 1891, 818.

*Oil of Mustard—Estimation.*—A. Schlicht estimates this oil by a modification of Dirck's permanganate method (oxidation of sulphur to sulphuric acid, and estimation of the acid as barium sulphate).

Schlicht shakes 80 parts of the oil with a solution of 4 parts of permanganate of potassium and 1 part of potassa, both salts, of course, absolutely free from sulphuric acid. The oil will be completely oxidized, the sulphur converted into sulphuric acid which combines with the potassa, and the nitrogen is dissipated as ammonia. It will be necessary to heat the mixture, and to repeat the shaking several times in order to make sure that the oil has been acted upon. In order to insure the complete separation of the manganese, an excess of alcohol is added (for each gm. of permanganate about 5 c.c. of alcohol). The manganese separates as $KH_3Mn_4O_{10}$. After complete refrigeration, the liquid is made up to 500 or 1000 c.c., vigorously shaken and filtered. Since the formed aldehyde reduces part of the potassium sulphate, it will be necessary first to reconvert it into the sulphate. An aliquot part of the filtrate is, therefore, slightly acidulated with hydrochloric acid, and a not too concentrated solution of iodine in potassium iodide is added, until a faint yellow color remains after stirring for some time and warming. The liquid now contains chiefly potassium sulphate, chloride, and acetate, a little free acetic acid, and a very small quantity of free iodine. The sulphuric acid is now estimated in the usual way as barium sulphate, and the weight of the latter, multiplied by 0.42492 gives the amount of oil of mustard for the fractional part of the filtrate ($BaSO_4$, 232.68 : $CSNC_3H_5$ : : 98.87—1 : x=0.42492).

The following will show how closely the method works:

| Mustard oil used. | Mustard oil. calculated from $BaSO_4$. |
|---|---|
| 0.1519 | 0.1525 |
| 0.4092 | 0.4084 |
| 0.1007 | 0.1005 |
| 0.2040 | 0.2039 |

Schlicht thinks that the above method might be applicable for the estimation of the sulphur in other easily oxidized organic substances.—Zeits. Analyt. Chemie, 1891, xxx., 661–665.

*Colza Oil* (*Rapeseed Oil*).—J. Moellinger calls attention to the fact that pretty nearly all colza oil, in commerce, is adulterated with cotton-seed oil, and that consequently Becchi's well-known test, which requires an addition of colza oil, is entirely unreliable.—Chem. Zeitg., 1892, 726.

CUCURBITACEÆ.

*Bryonia dioica—Constituents.*—A. Mankowsky states that of the two glucosides found in bryonia dioica, bryonin and bryonidin, the former is entirely without action, while the latter is poisonous only in large doses. The substances hitherto known as bryonin are simply more or less purified extracts of the root, and probably contain both glucosides. The bryonin of Schwertfeger is a mixture of the two glucosides with other substances, while Walz's bryonin is probably a mixture of this glucoside with bryonidin in smaller quantities. Introduced into the stomach, bryonidin causes inflammation of the stomach and larger intestines; introduced into the veins, only slight inflammation of the latter. The pancreatic juice decomposes it and renders it inoperative. It has no effect on the peristaltic action of the intestines.—Year-book Pharm., 1891, 163; Pharm. Journ. Trans., xxi, 496.

*Cucurbita Pepo,* Linné.—"*Analysis of Pumpkin Seeds,*" by Wm. E. Miller. The shells and kernels were separated, ground and analyzed with the following results:

| | Shells. | Kernels. |
|---|---|---|
| Benzin extracted | 2.8 | 33.6 (fixed oil.) |
| Ether extracted | 0.9 | |
| Alcohol extracted | 0.5 | |
| Yield of ash | 2.17 | 4.4 |

The fixed oil obtained from the kernels was of a dark reddish color, possessed little odor, but had a rank and somewhat bitter taste. It is freely soluble in ether, chloroform and hot absolute alcohol; but in 95 per cent. alcohol it is almost insoluble. With NaOH a soft brownish soap is obtained. No indications could be obtained of the presence of a glucoside or alkaloid.—Am. Jour. Pharm., 1891, 585.

*Elaterium—Purity.*—T. A. Ellwood found in three samples of English elaterium 19.7, 22.6 and 27.1 per cent. of elaterin, whilst three samples of Maltese elaterium, which always contains both chalk and starch, yielded 13.8, 15 and 17.2 per cent. of elaterin. He recommends the method of Ransom and Jones for the estimation of elaterin: Exhaust with chloroform, evaporate, extract with ether, redissolve in chloroform, and again evaporate and extract with ether.—Pharm. Journ. Trans., Nov. 1891, 395.

*Melon Seeds—Constituents.*—C. Forti found these seeds to contain cholesterin and a dextro-rotatory carbohydrate, apparently belonging to the galactan group. The oil yielded by the seeds to ether amounts to 49 per cent., and is almost free from fatty acids. It contains lecithin. The

phosphorus amounts to about 0.02 per cent.—Year-book Pharm., 1891, 194, from Chem. Centralbl., 1890, ii, 581. (Reprint from Le Stazioni Sperimentali Agrarie Italiane, Vol. xvii, fasc. v.)—Berichte, 1892, xxiv, 76, 77.

CUPULIFERÆ.

*Betula lenta*, Linné—"*On the Production of Oil of Birch.*"—Mr. Wm. Breisch describes the distillation and manufacture of the oil in Luzerne county, Pa. There are three ways of clearing the oil: by decolorization, filtration, and redistillation. The easiest method is decolorization by adding a few crystals of citric acid.

The yield, which is about one per cent., is most abundant during the months of July and August.

On taking a sample of the oil from the receiver only a short time after the separation of the water, he found the specific gravity to be 1.17; another sample from the same distillate, which was allowed to stand between 48 and 60 hours, so as to get more thoroughly separated, had the specific gravity 1.18, which proves that the lower specific gravity of pure oil of birch is due to water imperfectly separated.—Am. Jour. Pharm., 1891, 579–581.

*The Manufacture of Birch Oil.*—In the Scientific American for June 13, 1891, is an article on the manufacture of birch oil as carried on in New England.—Pharm. Jour. and Trans., 1891, 4, 5.

*Detection of Synthetic Oil of Wintergreen (or Birch).*—By Dodge and Olcott.—Pharm. Era, July 1891, 14.

*Castanea vesca*, Linné—*Chestnut Wood Tannin.*—By Prof. Trimble. Jour. Franklin Inst., 1891, 132, 303–307. An analysis of the wood, free from bark, collected from a large tree about 40 years old. The reactions and ultimate analysis of the tannin agree with those of gallotannic acid; so the author concludes that chestnut-wood tannin is gallotannic acid.—Jour. Soc. of Chem. Indus., 1892, 47, 48.

*Filbert—Microscopy of the "Shell."*—Zeits. Oesterr. Apoth.-Ver., 1892, 42.

*Preparation of Flavin.*—By V. H. Soxhlet (Chem. Zeit., 14, 1345–1346). The author gives the method for obtaining the natural dye, flavin, from the bark of the oak.—Abstract in Jour. Chem. Soc., 1892, 503, 504.

*Quercus abelica*, found in Crete, has a fragrant wood of a reddish color, and is known as the sandal-wood of Crete.—Chem. Drug., Aug. 1891, 221.

*The Cork Oak in California* (National Drug., Sept. 1891, 119).

*Quercus densiflora.*—"*The Tan Bark Oak,*" is one of the most beautiful of the Californian oaks. It is an evergreen, and forms in appearance a connecting link between the oak and the chestnut. The bark is thick, rough and exceedingly rich in tannin. The wood is straight-grained and tough; excellent for fuel, and will in all probability be found valuable to the wood-worker. The commercial value of its bark is so great that large

quantities are being hauled over rough mountain trails to the railroads or sea-coast. According to Carl Purdy, the bark only is used, and great masses of the wood are left to rot or become fuel for forest fires, and unless the onslaught is checked, the large and valuable growth of this fine oak will be entirely destroyed.—Gard. and For., v., 118.

*Oak Wood—The Tannic Acid of.*—Dr. Carl Böttinger continues his work on this tannin. From the acetyl derivative of oak wood tannic acid he obtained hydroquercic acid and querlactone.—Annalen, 263, 108–125.

*Quercetin and its Derivatives.*—By J. Herzig (Monatsh. 12, 172–176 and 177–190).—Abstract in Jour. Chem Soc., 1891, 1386, 1387.

### DIPTEROCARPEÆ.

*Doona zeylanica—Examination of the Resin.*—According to E. Valenta this tree, a native of Ceylon, yields a yellowish, more or less translucent resin, without any appreciable taste, and possessing an agreeable, though faint odor, more prominent on rubbing. By successive treatment with different solvents the author separated three resins: Alpha, beta, gamma.

*Alpha Resin* is easily soluble in methyl-, ethyl-, and amyl-alcohol, also in benzol, toluol, carbon bisulphide and chloroform. Doona-resin contains 65 per cent. of it. Its formula is $C_{24}H_{38}O_2$; 1 gm. neutralizes 23 mgm. of KOH; the iodine number is 60.

*Beta Resin* is very easily soluble in ether, insoluble in methyl-, and ethyl-alcohol. Its formula is $C_{21}H_{33}O$.

*Gamma Resin* is obtained from the residue left after treatment by alcohol ether, by dissolving in petroleum ether. Its formula is $C_{31}H_{49}O$.—Chem. Zeitg. (Rep.), 1891, 209, from Monatsh. Chem., 1891, 98.

### ERICACEÆ.

*Chimaphila umbellata and C. maculata.*—By Josiah C. Peacock. (Am. Jour. Pharm., 1892, 295–303.) The author made first a comparative analysis of the two species of Chimaphila. The results stated below are for the leaves separately and for the stems and roots together.

| | Chimaphila umb. | | Chimaphila mac. | |
|---|---|---|---|---|
| | Leaves. | Stems and Roots. | Leaves. | Stems and Roots. |
| Petroleum ether extract | 3.64 | .84 | 2.15 | .73 |
| Stronger ether extract | 5.15 | 4.42 | 3.89 | 1.69 |
| Absolute alcohol extract | 21.09 | 9.79 | 17.26 | 6.25 |
| Water extract | 11.00 | 11.47 | 10.45 | 9.90 |
| Alkaline (NaOH) water extract | 4.81 | 4.46 | 5.50 | 7.88 |
| Acidulated (HCl) water extract | 4.50 | 4.20 | 5.80 | 3.60 |
| Starch | 1.91 | 3.34 | 2.51 | 3.59 |
| Moisture | 14.60 | 12.80 | 13.00 | 12.72 |
| Ash | 3.88 | 3.00 | 3.92 | 4.12 |
| Undetermined (cellulose) | 29.42 | 45.68 | 35.52 | 49.52 |
| Total | 100.00 | 100.00 | 100.00 | 100.00 |

This work was undertaken for the purpose of inquiry into the nature of the crystalline compound chimaphilin; and also, as no information could be obtained regarding the isolation of this principle from Chimaphila maculata, it was decided to examine it also in the same connection. The fresh plant of C. maculata did not contain chimaphilin. It was only obtainable when the plant was dried in the ordinary way. Experiments were not made to prove that C. umbellata when fresh may not yield it likewise.

From alcohol chimaphilin separated in compact masses composed of yellow needles radiately arranged, and which as stated above melted at 113–114° C. These needles had but little taste; but they produced a slight tingling of the tongue and fauces. They were nearly destitute of odor also. They were insoluble in water, but soluble in both ordinary and absolute alcohol, chloroform, ether, benzol, benzine, acetone and glacial acetic acid, and from the last solvent were precipitated, in crystalline form, to all appearances unchanged, upon the addition of water.

When carefully heated they sublimed and condensed again apparently unaltered from their original condition. Neither alcoholic solution of lead acetate nor of ferric chloride had any effect upon them. Concentrated sulphuric acid gave a red color which changed to yellow with nitric acid. Nitric acid dissolved them, giving a yellow solution. Boiling caused no change in this solution, but upon the addition of water the chimaphilin was precipitated to all appearances unaltered.

Alcoholic solution of potassium hydrate gave a brown-green color. Aqueous solution of the same was without effect. These properties agree in general with those described by Beshore.

The crystals were free from nitrogen.

The substance was submitted to combustion, with the following result:

| | I. | II. | Average. | Calculated for $(C_{21}H_{21}O_4)_x$ |
|---|---|---|---|---|
| C | 77.29 | 77.43 | 77.36 | 77.21 |
| H | 5.63 | 5.65 | 5.64 | 5.63 |
| O | 17.08 | 16.92 | 17.00 | 17.16 |
| | 100.00 | 100.00 | 100.00 | 100.00 |

Mr. Peacock secured three other crystalline substances containing no other elements than carbon, hydrogen, and oxygen. They occur: 1. In matted crystals. 2. Tufted crystals. 3. Glistening crystals. In solubility, behavior towards reagents, and other properties, these three crystalline substances are distinguished from all previously known ones occurring in the Ericaceæ.

*Chimaphila umbellata.*—By M. Bardet. This plant owes its diuretic properties to a principle analogous to arbutin.—Rép. de Pharm., 1891, 336, 337.

*Oil of Wintergreen—Experience with.*—By Robt. A. Wilson. (Oregon State Pharm. Assoc.; reprint from Pacific Drug Review, in the Pharm. Era, Sept., 1891, 167.) The author feels that the Pharmacopœia ought to include oil of wintergreen as Oleum Gaultheriæ procumbentis and oil sweet birch as Oleum Betulæ lentæ.

*Oils of Wintergreen, Natural and Synthetic.*—By Prof. F. B. Power. (Pharm. Rundschau, 1892, 7–9). A review of some assumed tests for the discrimination of natural and synthetic oils of wintergreen, and a reliable test of purity for these oils. He gives a method, by means of which he has convinced himself he can detect the presence of 5 per cent. of sassafras or camphor or petroleum. The method is the following: If to 1 c.cm. of the oil (Gaultheria, Birch, or Synthetic Methyl Salicylate), contained in a capacious test tube, 10 c.cm. of a 5 per cent. solution of sodium hydrate be added, and the mixture agitated, a bulky, white crystalline precipitate is produced, and if the tube, loosely corked, be subsequently placed in boiling water for about five minutes, with occasional agitation, a clear, colorless or faintly yellowish and complete solution should be obtained without the separation of any oily drops, either on the surface or at the bottom of the liquid (absence of other essential oils or of petroleum). If the liquid thus obtained be subsequently diluted with about three times its volume of water, and a slight excess of hydrochloric acid added, a white crystalline precipitate will be produced, which, when collected on a filter, washed with a small amount of water, and recrystallized from hot water, should respond to the tests for identity and purity of salicylic acid (absence of methyl benzoate, etc.).

*Oleum Gaultheriæ—Natural and Artificial.*—Dr. Neumann Wender publishes the following distinctive test: Dissolve one drop of the oil in 1 c.c. of alcohol, add 1 c.c. of concentrated sulphuric acid, and 2 drops of furfurol water (1 : 200). On warming, the natural oil mixture acquires a dark purple-brown color, whilst the artificial is colored only faintly pink. This reaction is of value only for distinguishing one oil from the other, but will be of no service in testing the mixed oils—because it is based on a reaction of terpene, which body is present of course in the natural oil, but not in the artificial.—(Ztschr. Oesterr. Apoth.-Ver., 1891, 29, 359.) Chem. Zeit., 1891, 209.

*Oil of Wintergreen—Natural and Artificial.*—An American firm gives as a reliable distinction, that the artificial oil dissolves more fuchsin than the natural, because it contains methyl-alcohol. Schimmel & Co. point out that, in the first place, the difference is too slight to be made use of as a distinguishing test; in the second place, the reason why the natural oil does not dissolve as much fuchsin as the artificial oil is that the natural oil contains besides ethylmethylsalicylate, terpene, which latter does not dissolve fuchsin. The consequence would be that an oil, heavily adulter-

ated with oil of turpentine, paraffin oil, etc., would be considered a good oil.—Pharm. Rundschau, N. Y., 1891, 275.

*Andromedotoxin.*—In connection with his continued researches on this poisonous principle of certain ericaceæ, Prof. Plugge gives in *Arch. d. Pharm.*, 1891, 552, a complete list of the plants examined in this respect. The lists published in Am. Jour. Pharm., 1889, 360, 361, may now be extended as follows:

The poison is present in Kalmia angustifolia, *Lin.*, Monotropa uniflora, *L.*, Pieris formosa, *Don*, P. ovalifolia, *Don*, Rhododendron Falkoneri, *Hook.*, R. grande, *Wight*, R. barbatum, *Wallich*, R. fulgens, *Hook.*, R. cinnabar, *Roxb.*, and R. punicum, *Smith.* The poison is absent from Arbutus Andrachne, *L.*, A. canariensis, *Lam.*, A. integrifolia, Lam., A. Unedo, *L.*, Arctostaphylos alpina, *Spr.*, A. glauca, *Lindl.*, Erica arborea, *L.*, Pyrola maculata, *L.*, P. rotundifolia, *Lin.*, Ledum latifolium, *Lam.*, and Rhodo. ferrugineum, *L.*—Am. Jour. Pharm., 1891, 603.

*Rhododendron ponticum—A Poisonous Honey from.*—By P. C. Plugge (Arch. d. Pharm., 229, 554–558.—Berichte, 1891, 24, 969.

## EUPHORBIACEÆ.

*Croton Sp.*—Under the name of "Santal vert," a very close-grained, dense and heavy wood is exported from Madagascar and Zanzibar into India, where it is used in the funeral piles for burning the bodies of Hindoos.—Chem. Drug., Aug. 1891, 220.

*Castor Oil—New Habitat.*—The plant grows wild over the greater portion of the known districts of South Formosa, and quite a lucrative trade might be made in the oil.—Chem. and Drug., July 25, 1891, 155.

*The Castor Bean.*—(From Am. Gro.) An account of the culture of the castor bean, with an account of the uses of the oil obtained from the seeds.—Pharm. Era, June 1892, 383.

*Ol. Ricini.*—According to H. Meyer (*Arch. f. exper. Pathol.*, 28, 145), the purging action of castor oil is due to ricinolic acid and its glyceride. Besides these two bodies the ricinelaidic acid was also experimented with. All three produced purging with cats.—Am. Jour. Pharm., July 1891, 341.

*Examination of Castor Oil for Cotton Seed Oil.*—Mix 10 gm. of oil of ricinus with 6 gm. of a reagent, composed as follows: Nitrate of silver, 5 gm.,; nitric acid, 1 gm.; alcohol, 100 gm. This mixture should be well stirred, and placed for five minutes upon a water-bath heated to 100° C. If cotton-seed oil be present, there will be a red coloration, but if the oil of ricinus is pure, there will be no change.—Boll. farm. No. xxx., Feb. 1891; Apoth. Zeit., 1891, 290; Am. Jour. Pharm., July 1891, 251.

*Sweetened Castor Oil* is prepared by thoroughly washing with hot water

freshly expressed castor oil, and incorporating sufficient saccharin to give it a sweet taste; it is then flavored by adding small quantities of oil of cinnamon and extract of vanilla. The preparation is stated to keep very well and to be very agreeable in taste.—Standke, Rundschau, 1892, 111; Am. Jour. Pharm., 1892, 143.

*Castor Oil.*—Experiments made by Mr. Dott and Dr. Stockman regarding the active principle. They obtained a ricinoleic acid which was not purgative.—Phar. Jour. and Trans., 1892, 745, 746.

*Ricinoleic Acid—The Polymeric Acid to.*—By Scheurer-Kestner.—(Compt. rend., 1891, 113, 201).—Chem. Zeitung, 1891, 225.

*Castor Oil—Estimation in Oily Mixtures.*—J. Braun submits a weighed sample to dry distillation in a tared distilling flask, capable of holding 100 to 200 c.c. The heat is rapidly raised to 265° C.; after 15 to 30 minutes the mass suddenly swells up, when the flame is removed. The contents of the flask are allowed to cool from 50° to 60° C., and then washed successively with 5 per cent. ammonia, water, alcohol and ether, shaking the mass up well. The weight of the residue multiplied by 1.63 gives the weight of the castor oil.—Chem. News, 1891, lxiv., 113; from Zeits. Analyt. Chem., 1891, xxix.

*Cotton-seed Oil—Test.*—The usual tests for the presence of cotton-seed oil in lard and olive oil (silver nitrate, gold chloride, lead acetate) fail in case the cotton-seed oil has been heated. Mecke and Wimmer have found that the heated oil reacts with Welman's sodium phosphomolybdate test (which see under Lard), although somewhat fainter.—Zeits. Analyt. Chem., 1892, 107; from Zeits. angew. Chem., 1891, 518.

*Ricin and Abrin.*—By Herr Ehrlich (Deut. med. Wochens., 1218). The author has shown that these two substances are quite distinct. One peculiarity of abrin is that it causes the loss of hair spreading round the point of injection in the eye. In toxic properties, ricin was found to be about twice as powerful as abrin, but in their action on the membrane of the eye this relation is reversed. Further, it was found possible by special treatment to render an animal immune against abrin, or against ricin, but the immunity against one of these albumoses does not involve immunity against the other.—National Drug., Dec. 1891, 215.

*Ricinus communis—A Contribution to the Development History of the Seed Coats of the Euphorbiaceæ, particularly regarding.*—By George Kayser (Ber. d. Pharm. Ges., 1892, 5–19).

*Euphorbia marginata*, Pursh.—This garden plant, commonly called "snow on the mountain," is indigenous to the U. S. Applied to the skin, it produces effects resembling those of poison-oak (Botanical Gaz., 1890, p. 276). It would be of interest to determine the nature of the irritating principle of this plant, likewise the amount of fixed oil obtainable from the

seeds, and to what extent this may possess purgative and rubefacient properties.—Am. Journ. Pharm., July 1891, p. 324.

*Euphorbium—Test for Purity.*—H. Beckurts and W. Brueche found the acid number to be from 18 to 25; ester number from 49 to 68: saponification number from 70 to 83; and the ash from 1.3 to 2 per cent.—Archiv pharm., 1892, ccxxx., 91.

*Kamala.*—In a recent report issued by Cæsar and Loretz, the results of sifting commercial kamala, with the view of separating as much as possible the portions containing much mineral matter, are given; of the lots purified during the past two years, the best one gave percentage results as follows: 55 per cent. of worthless impurities, as dirt, fruit and bark particles:

| | | | | | | |
|---|---|---|---|---|---|---|
| | 12, | 10, | 3, | 2 and | 18 per cent. | purified kamala, |
| containing | 20, | 16, | 10, | 7.5 | 6 " | ash. |

The last lot that was purified yielded 58 per cent. of worthless impurities, and

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | 5, | 10, | 4, | 8, | 9 and | 4 per cent. | purified kamala |
| yielding | 40, | 35, | 24, | 21, | 14 and | 12.5 " | ash. |

These results are confirmed by examinations of various commercial samples of kamala made during the last year.—Apotheker Ztg., 1891, 495; Am. Jour. Pharm., Nov. 1891, 535.

*Kamala.*—Prof. Flückiger recently received from Dr. M. Greshoff, of Java, ripened capsules of the kamala plant, which air-dried weighed 207.10 grams; from these were obtained 12.74 gm. seeds, 22.66 gm. kamala (containing 3.92 per cent. moisture) and 171.70 gm. capsule integuments; the kamala therefore amounted to 10.79 per cent., and was found to yield from 1.3 to 1.5 per cent. ash, depending upon the quantity taken for the determination. The integuments incinerated yielded 4 19 per cent. ash, so that if admixed, would not account for the high percentage of ash in the commercial article; the undesirable parts of the capsule can be so readily separated by sifting that it is not possible to see how the "method of collecting" can increase the percentage of ash unless the collector use bolus or other adulterating agent.

Attention is called to the similarity in usage of waras by the Arabs and Africans, and to the open adulteration of the same for hundreds of years past, so that it is not considered to be an adulteration, but a sacred custom.—Arch. der Pharm., 1892, 2; Am. Jour. Pharm., 1892, 310.

*Proportion of Ash Furnished by Kamala.*—By P. Siedler and Th. Wagge. (Ber. d. D. Pharm. Ges., p. 87, 1891, from Rep. der Pharmacie, p. 79, 1891.)—Jour. Pharm. Chim., 1891, 298, 299.

*The Manihots.*—Mr. Arthur Edward Hanson gives facts that are of interest concerning the history, varieties, uses and cultivation of the Man-

diocas, as well as the products manufactured therefrom. There are two kinds of Mandioca, viz: The bitter, or red or black, Manihot utilissima, Pohl, and the sweet or white (Manihot palmata, M. Arg.), from which spring the many useful varieties distinguished by their color.

*Mandioca doce* (sweet) or Manihot palmata, is, in the Southern States, called aypim, and in the Northern States, macanera. In the roots of the white varieties the milky fluid is scarcely observable, and if present, is always in the bark; a white fibrous wood bundle runs through the centre, which is as thick as ordinary twine (about one-sixteenth of an inch), and is never found in the bitter mandioca. The white mandioca is seldom used for flour (farinha) and should never be dug up for use while flowering, as it is then watery and has an insipid taste. These fleshy roots, when boiled or baked, become mealy like potatoes, and frequently take their place.

*Bitter Mandioca,* as it is commonly called, "Manihot utilissima," Pohl, contains a great deal of milky juice, which is of thick consistency and reddens blue litmus. The juice is found in the whole plant, including the roots. All bitter mandiocas are poisonous, due to the presence of hydrocyanic acid, or a substance which is easily converted into it. After being exposed to the air for thirty-six hours, the juice loses its deleterious properties, and the same thing happens when it is boiled or submitted to distillation. Some botanists regard Manihot utilissima, Pohl, as the mother plant, and all other cultivated mandiocas as derivatives of the same. *Mandioca assu* (giant) is generally fed to cattle.

*Maniva manipeba,* of which there are two varieties, is extremely poisonous; one of them animals will not even touch, and the other yields a flour which ants also reject.

*Cultivation of Mandioca.*—The mandioca is planted in the months of March and September; it takes from eighteen months to two years before it is ready for use, and three years before it is mature. It belongs to the richest of starch producers, and from a given space of ground will yield six (6) times as much flour as any other amylaceous plant.

*Manufacture of "Farinha" and "Tapioca."*—The root is scraped, washed, grated, and then put into baskets; the poisonous juice is expressed and collected into troughs, where it is allowed to stand for some time with the water used for washing the pulp; the liquid is poured off, and the sediment, which is a white fecula, is dried; it is called "Tapioca." The pulp from the press-out of the basket is sifted. graded, afterwards roasted and torrefied, whereby it is deprived of the poisonous properties, and assumes a granular appearance; it is "Farinha." Farinha is also made by another process, when it is called "*farinha puba.*" The "Beyou," much appreciated by the natives, is made by taking a handful of the farinha and placing it in little portions all over a hot pan, after which, beginning with the first,

these portions are flattened, thinned, then rolled into numerous fancy shapes. They are very delicious. The farinha, mixed with water and made into poultices, is used very much for inflammations and abscesses.—Am. Jour. Pharm., Aug. 1891, 391–395.

*Phyllanthin.*—M. Ottow (Nederl. Tijds. voor Pharm., 1891, 3, 128), isolated from *Phyllanthus Niuri*, euphorbiaceæ, indigenous to Java and there used in medicine, a bitter principle *phyllanthin*, $C_{30}H_{37}O_{6}$. This crystallizes in colorless needles or flakes, possesses an intensely bitter taste, and is almost insoluble in water, easily soluble in alcohol, petroleum ether, ether, chloroform, benzene and glacial acetic acid. At 200° C. (392° F.) it is volatilized and condensed as an amorphous mass in the cooler portions of the vessel. In a few days the amorphous variety changes to the crystalline state.—Am. Jour. Pharm., Dec. 1891, 596.

*Sebastiana Palmeri*, Rose, *and Sebastiana Pringlei*, Watson.—In the Scientific American for June 13, 1891, is an article on the "arrow-weed" and Mexican "jumping beans." Prof. C. V. Riley has determined the plant upon which these "jumping" seeds are produced. There is good evidence that the insect causing the saltations of the "beans" develops in the capsules of at least these two species of Sebastiana. S. Palmeri is popularly known as the "arrow-tree which produces the jumping beans."—Pharm. Jour. and Trans., 1891, 64.

FILICES.

*Aspidium Athamanticum.*—Known in South America as "Uncomocomo," and also as "Rhizoma Pannæ." R. Kürsten (Archiv, p. 258,) has examined the rhizome histologically and chemically. The rhizome presents considerable resemblance in structure to that of male fern, but is larger in size, and the structure of the glands inside the intercellular cavities is sufficiently distinct to enable the two rhizomes to be distinguished. The active principle of the root appears closely to resemble filicic acid, but is not identical with it. To this body Kürsten has given the name "pannic acid."—Pharm. Jour. and Trans., 1891, 85.

*Aspidium Filix mas*, Swartz.—Herr Poulson, in a communication from the Pharmacological Institute at Strassburg (Archiv f. Exp. Path. u. Pharmakol., July 3, 1), says that if pure crystalline, completely inactive filicic acid be dissolved in alkalies and reprecipitated by any acid, the amorphous precipitate so obtained possesses exactly the poisonous properties of the extract. He further shows that these two physiologically different modifications of filicic acid also differ in chemical relations, and there is little doubt that the inactive crystalline body is an anhydride or lactone of the amorphous filicic acid and is better termed *filicin*. Filicin melts at 184.5° C., *filicic acid* at 125° C. Whether the inertness of *filicin* depends upon the chemical constitution, or whether it is to be attributed to its insolubil-

ity in aqueous fluids, it is difficult to decide. Filicic acid is well adapted for therapeutic use, since it is easily dissolved, held in solution in the intestines, and is only absorbed very slowly, thus effecting the expulsion of parasites without injuring the organism of the part. These results accord with experience, as they explain why a freshly-prepared extract is much more active than an older preparation.—Pharm. and Trans., 1891, 84, 85.

*Poisoning by Male Fern* is reported by Hofmann (*Wien. klin. Wochenschr.*) in the case of a girl 5½ years old, who took 7.5 gm. oleoresin of male fern in three doses within 1¾ hours. A portion of the tape worm was expelled in 1½ hours, then vomiting and somnolence set in, which after three hours, was followed by convulsions and death. The fatal result was presumably caused by impaired resistance due to miliary tuberculosis of the lungs and abdominal glands.—Am. Jour. Pharm., July 1891, p. 376.

### FUMARIACEÆ.

*Corydaline—Formula.*—J. J. Dobbie and A. Lauder have analyzed corydaline and found it to have the formula $C_{22}H_{28}NO_4$ which differs from that given by Wicke ($C_{18}H_{19}NO_4$).—Journ. Chem. Soc. Trans., 1892, lxi., 244–249.

### FUNGI.

*Ergota—and its Preparations.*—R. Kobert has made clinical and physiological experiments with the various constituents of ergot, and arrives at the conclusion that cornutine is the most active constituent.

*Cornutine—Preparation.*—Exhaust the drug with water, acidulated with hydrochloric acid, neutralize the aqueous solution nearly with sodium carbonate, evaporate in vacuo at a very low temperature to a syrupy consistence, and treat with alcohol. Filter, distil off the alcohol carefully, and treat the nearly dry product with anhydrous ether, which removes any ergotinine present. After making the residue alkaline with sodium carbonate it is treated with acetic ether, and the solution shaken with water containing a little citric acid, which removes the cornutine in an almost pure state. This process is repeated, and it is finally precipitated from its acetic ether solution by anhydrous ether. Prepared in this way, cornutine will, if kept dry, and not exposed to light, remain unchanged. (The author kept some for three years.)

*Preparations.*—As regards the preparations, Kobert considers the fluid extract of the U. S. P. as approaching, when fresh, more nearly to the natural drug. No matter how the extracts are made, they become practically valueless within nine months. Neither sterilizing nor the use of antiseptics could protect an aqueous preparation from change, as this is not due only to fermentation or the presence of bacteria, but also to independent chemical decomposition. Water is the worst solvent which can

be used; the only way to obtain a reliable extract is to treat the powdered ergot with petroleum ether to remove fatty oil, and then to exhaust with rectified spirit. This tincture is evaporated until 15 grains represent 150 grains of ergot: and it contains the chief active principles, cornutine and sphacelic acid.—Year-book Pharm., 1891, 190, from Chem. Drug., 1890.

*Ergota—Presence of Mannan.*—By macerating 300 gm. powdered ergot deprived of oil with 1500 gm. 5 per cent. sodium hydrate solution for forty-eight hours, straining, mixing 500 gm. filtrate with 1000 c.c. 90 per cent. alcohol, filtering off the precipitate, triturating it with 300 c.c. alcohol acidulated with hydrochloric acid, filtering, washing the insoluble part with alcohol until the filtrate passes through colorless, and drying at 40–50° C., Dr. A. Voswinkel obtained 15.8 per cent. of a brown, amorphous, hygroscopic substance which he proved by hydrolysis to yield mannose; the body itself is a hemi-cellulose to which the name "mannan" is given. Sclerotic acid and scleromucin found by Dragendorff in ergot were prepared according to Dragendorff, and proven to be identical with "mannan;" the yield of these substances was only 4.8 per cent., and this is explained by mannan being less soluble in water than in sodium hydrate solution. The physiological action of sclerotic acid is doubted by Voswinkel because of the fact that mannan is also a constituent of salep and of coffee. Mention is also made of the extract of ergot as prepared by the Pharm. Germ. III.: Two parts of ergot are exhausted with two portions of water, the filtrates are united, evaporated to one part, and one part dilute alcohol added; it is claimed that the alcohol added is insufficient to precipitate all of the mannan, that by the use of three parts of alcohol this can be effected, and that such an extract would give a clear solution with 65–70 per cent. alcohol, and also would be more effective.—Am. Jour. Pharm., 1891, 537, from Pharm. Centralh., 1891, 531.

*Fungi—Resistance to Corrosive Sublimate.*—H. W. Russel states that glycerin containing 1 part in 10,000 parts is capable of sustaining Penicillium glaucum, while a proportion of 1 part in 6000 or 1 part in 4500 effectively prevents its growth. This fungus appears to be somewhat less resistent than some other forms.—Botanical Gazette, through Pharm. Jour. and Trans., July 25, 1891, 70.

——— *Presence of Sugars.*—R. Ferry found, on examination of 82 varieties (*Ascomycetes* and *Basiciomycetes*), that mannitol was very widely distributed, and trehalose much less frequently. In only a few was there any substance present capable of reducing alkaline copper solution. Several species contained considerable quantities of potassium chloride.—Journ. Chem. Soc., 1891, 954, from Chem. Centralbl., 1891, i., 220.

*Volemite.*—M. Bourquelot (Rép. de Pharm., 1891, 838) isolated from *Lactarius volemus*, a fungus, a saccharine body to which he has given the name of volemite. He extracted the fungus with 90 per cent. alcohol, re-

covered the alcohol, and treated the residue with 95 per cent. alcohol. Volemite crystallizes in colorless needles, which are radially arranged, fuses at 140° C. (284° F.), and is more soluble in water and alcohol than mannite. It possesses no reducing power, does not ferment, is not altered by dilute sulphuric acid, and does not yield an osazone. Its rotatory power is $a_D = +2.4°$.—Am. Jour. Pharm., 1891, 597.

*Volemite, a Sugar from Lactarius volemus.*—M. Bourquelot (Soc. de Phar. de Paris, June 3), showed a sample of the above, extracted by treating the plant with 90 per cent. alcohol, and then taking up the residuum several times with 95 per cent. alcohol, in order to get a pure and crystallized product. Volemite appears as colorless needles grouped in spheroidal forms about the size of a millet-seed. It fuses at 284° F. It is more soluble than mannite in both water and alcohol, has no reducing properties, does not ferment, is not modified by diluted sulphuric acid, and does not give off osazone. Its rotatory power, $a_D = + 2.4°$, is not augmented by the presence of boric acid, but is increased under the influence of borate of sodium. Analysis has not thus far decided whether volemite is a glucoside or a mannite, but M. Bourquelot thinks it ranges with the latter. With benzoic aldehyde and paraldehyde it gives crystallized acetyls (lævogyre), which are analogous to those prepared from mannite by M. Meunier. The author stated that volemite is not *identical* with any of the known mannites, and that he has not yet been able to transform it into glucose.—Répert. de Phar., July 10; Am. Jour. Pharm., Sept. 1891, 465, 466.

GENTIANACEÆ.

*Erythrocentaurin*, was extracted from *Erythræa Centaurium*. This principle, except for its color, which is almost white, had the same physical properties as menyanthin; it also resembled it in its behavior toward the alkaloidal and decomposing reagents; it, however, had the formula $C_8H_{14}O_5$, and in its decomposition a dextrogyre carbohydrate was produced.—Karl Leudrich, Arch. der Pharm., 1892, 38 and 48; Am. Jour. Pharm., 1892, 311.

*Gentisin.*—By S. V. Kostanecki (Monatsh., 12, 205–210). Gentiseïn, obtained by boiling gentisin with hydriodic acid, melts at 315°. It is soluble in alkalies with a yellow color, gives a blood-red coloration with sodium amalgam, and a deep red precipitate with acids. In contradistinction to gentisin, gentiseïn dyes wool a pale yellow in presence of an aluminium mordant; the hydroxyl group, which in gentisin is methylated, thus appears to have tinctorial properties.

Triacetylgentiseïn melts at 226° and is more sparingly soluble than diacetylgentisin.—Jour. Chem. Soc., 1891, 1386.

*Gentisin.*—By S. V. Kostanecki and E. Schmidt (Monatsh., 12, 318–322). Dimethyloxygentiseïn can be obtained by heating gentiseïn or

gentisin with potash and methyl iodide in methyl alcoholic solution at 100°; its alkali derivatives are intensely yellow compounds; it crystallizes from glacial acetic acid in broad, yellow needles, melts at 167°, and is sparingly soluble in alcohol.

The acetyl derivative crystallizes from alcohol in colorless needles and melts at 189°.—Jour. Chem. Soc., 1891, 1386.

*Gentiana verna—Substances Contained in.*—By G. Goldschmidt and R. Jahoda (Monatsh., 12, 479–485). From the resinous mass they obtain three compounds by fractional distillation. To one they give the name *gentiol.* The other two fractions are only obtained in small quantity.——Jour. Chem. Soc., 1892, 205.

*Bitter Principles.—Menyanthon,* from *Menyanthes trifoliata,* was extracted by treating the powdered herb with ether, then with 98 per cent. alcohol; the solutions evaporated to extract consistency, exhausted with water at 50–60°, and these aqueous solutions were separately treated because of the presence of tannin only in the one from the alcoholic extract. This was first precipitated with lead acetate, filtered, the excess of lead separated with $H_2S$, warmed to remove the excess of $H_2S$, and the free acetic acid neutralized by digestion with barium carbonate, and filtered. The aqueous solution from the ether extract was agitated with moist aluminium hydrate, and filtered; both filtrates were now treated in the same manner, concentrated in vacuo, mixed with sand, evaporated to dryness, extracted with alcohol, this solution concentrated and impurities precipitated by addition of ether, and the solution of the bitter principle further purified by treatment with animal charcoal. Both extracts contained the same principle, which was of a yellow color, neutral reaction, and pure bitter taste; it was easily soluble in alcohol and boiling water, much less in cold water and ether. Although free from nitrogen, formula $C_{33}H_{50}O_{14}$, it gave precipitates with tannin, Mayer's reagent, iodine, phospho-molybdate of sodium, and bismuth-potassium iodide; auric chloride and Fehling's solution were reduced; baryta and lime water, also dilute acids, decomposed it, its solution losing the bitter taste. Its decomposition products are an aldehyde and phenol-like body called menyanthol, $C_7H_{11}O_2$, a resinous product, and a lævogyre carbohydrate.—Am. Jour. Pharm., 1892, 310, 311.

*Gentian—Tannin Present and Removable from.*—By W. H. Wearn (N. C. Pharm. Assoc. Proc.).—Western Drug., 1891, 445.

*Sabbatia angularis,* Pursh.—An analysis of American centaury was made in 1871, by J. F. Huneker, who announced the presence of a neutral principle—erythrocentaurin; but did not succeed in isolating the bitter principle. Mr. William T. Hankey obtained from the ethereal percolate a greenish resin, also a minute quantity of a crystalline substance, reddish-yellow in color, possessing a sharp acid taste, and having a

strong pungent odor, resembling that of nicotine. It is soluble in water, alcohol and ether, and gives negative results with alkaloidal reagents. It is non-glucosidal in character and was confirmed by Mr. Hankey as the principle isolated by Huneker in 1871, and called by him erythrocentaurin. He endeavored to isolate the bitter principle, which he found was insoluble in chloroform, ether, benzol and amyl alcohol. He divided the solution containing the bitter principle into two equal portions. After treating one portion with animal charcoal he obtained from a 95 per cent. alcoholic solution a bitter amorphous transparent extract of a reddish-yellow color, which could not be crystallized. The other portion was treated differently, but all attempts failed to obtain this bitter substance in a crystalline condition. It reduced Fehling's solution abundantly, was changed to a ruby-red color by $H_2SO_4$ and to a dark-green by ferric chloride.

A proximate analysis of the plant gave the following results:

| Solvents used. | Substances obtained | Per cent. | |
|---|---|---|---|
| Petroleum ether | Volatile oil | .01 | |
| | Fat | .91 | |
| | Wax | .70 | |
| | Caoutchouc | .37 | |
| | | | 1.99 |
| Stronger ether | Greenish resin | .72 | |
| | Erythrocentaurin | .05 | |
| | Undetermined | .12 | |
| | | | .89 |
| Absolute alcohol | Bitter principle | 3.75 | |
| | Greenish resin | .62 | |
| | Glucose | .43 | |
| | Extractive | 1.57 | |
| | | | 6.37 |
| Distillled water | Mucilage | 2.16 | |
| | Dextrin | 1.13 | |
| | Glucose | 1.25 | |
| | Saccharose | .88 | |
| | Undetermined | 5.56 | |
| | | | 10.98 |
| Dilute soda solution | Pectin and albuminoids, | | 6.06 |
| Dilute hydrochloric acid | Pararabin | 1.20 | |
| | Extractive | 2.98 | |
| | | | 4.18 |
| Chlorine water | | | 7.40 |
| Nitric acid and potassium chlorate | | | 13.90 |
| | Cellulose | | 36.50 |
| | Ash, soluble in water | 1.17 | |
| | Soluble in HCl | 1.30 | |
| | Insoluble | .38 | |
| | | | 2.85 |
| | Moisture | | 8.05 |
| | Loss | | .83 |

—Am. Jour. Pharm., July 1891, 335–338.

## GNETACEÆ.

*Ephedra monostachya*.—From the ethereal extract of the herb P. Spehr succeeded in isolating minute quantities of an alkaloid. From Ephedra vulgaris var. helvetica, *Hook. et Thomp.*, there have been isolated two alkaloids; no color reactions are known for these. The following table shows the differences between these several alkaloids:

| | Ephedrine. From *E. vulgaris* | Pseudo-ephedrine. From *E. vulgaris* | Ephedrine. From *E. monostachya*. |
|---|---|---|---|
| Formula | $C_{10}H_{15}NO$ | $C_{10}H_{15}NO$ | $C_{13}H_{19}NO$ |
| Melting point of the alkaloid | 210° C. | 115° C. | 112° C. |
| The chlorhydrate | 216° C. | 174° C. | 207° C. |
| Solubility in water | difficultly | 1:454 | very easily |
| Alcohol | easily | very easily | very easily |
| Absolute ether | easily | 1:15 | 1:98 |
| Ether | easily | 1:24 | 1:109 |
| Benzol | easily | 1:26 | 1:1180 |
| Chloroform | easily | 1:8 | 1:11 |
| Petroleum ether | very difficultly | almost insoluble | 1:13750 |
| Taste | bitter astringent | bitter astringent | burning anæsthetic |
| Action | strongly poisonous; mydriatic | strongly poisonous; mydriatic | almost inert |
| Form of crystals of the alkaloid | rhombic prisms | rhombic prisms | monoclinic |
| The chlorhydrate | rhombic | rhombic | hexagonal |

—Pharm. Ztschr. f. Russl., 1892, No. 1–7; Am. Jour. Pharm., 1892, 234.

*Ephedra vulgaris* is esteemed in Russia as a popular anti-rheumatic remedy. Dr. Betchine of St. Petersburg (*Lyon Médicale*) has found the bark and the root quite efficacious in acute articular rheumatism with high fever, but in chronic rheumatism not accompanied by fever only temporary relief could be observed. See also Am. Jour. Phar., 1884, p. 540; 1890, p. 339, 397.—Am. Jour. Pharm., 1892, 193.

## GRAMINEÆ.

*Barley—Influence of Temperature on the Germination.*—T. Cuthbert Day has instituted a series of experiments on the germination at different temperatures, and states as the result that the most important point brought to light is that the sugars reach their maximum, the starch suffers the greatest amount of degradation, the permanently soluble nitrogenous compounds are present in the greatest quantity, and the diastatic ferment

is the most active, all in the malt grown throughout at a temperature of 55° F.—Journ. Chem. Soc., Sept. 1891, 664–667.

*Oil of Citronella—Botanical Source, etc.*—It is the *Andropogon Nardus* of Linnæus; its synonyms are: *A. flexuosus* and *coloratus*, Nees; *A. Martini*, Thwaites; and *Cymbopogon Nardus*, Linn. This is very common in the plains of the Punjab and Northwest Provinces, and extensively cultivated in Ceylon and at Singapore. In Ceylon the oil of citronella grass is raised from seed, and is planted like guinea-grass, often attaining a height of six or eight feet; it yields two or three crops a year. The oil is largely adulterated in the East with kerosene, large quantities of which are imported in Ceylon, in great excess of the requirements for illuminating purposes; samples have been found to contain 18 per cent. of it. J. C. Sawer.—Chem. and Drug., July 25, 1891, 126.

*Grass Oils and their Varieties.*—The Chem. and Drug., July 25, 1891, 126–129, contains an article on the four oils known as grass oils, the particulars of which will be found under the respective oils: citronella, lemon-grass, vetiver, ginger-grass (geranium).—Drug. Circ., 1891, 244–246.

*Oil of Geranium.*—Schimmel & Co. call attention to the fact that the oil of geranium is very apt to acquire a very offensive odor on prolonged contact with the tin of the original containers, due to the presence of a small quantity of hydrogen sulphide. They advise to expose the oil to the air for a couple of hours, best in porcelain capsules.—Zeits. Oesterr. Apoth.-Ver., 1892, 327.

*Algerian Oil of Geranium—Botanical Source, etc.*—This oil is derived from three species of *Pelargonium: P. odoratissimum*, Willdenow; *P. capitatum*, Aiton, and *P. roseum*, Willdenow. These plants are cultivated in many parts of Algeria, and the average production is about 6,000 kilos. Plants cultivated on dry soil yield a finer oil, but a much smaller quantity than those grown on irrigated soil. The plants are gathered as soon as the lemon-like odor gives place to the odor of rose; the oil resides entirely in the leaves and green parts of the plant.—J. Ch. Sawer, Chem. and Drug., July 25, 1891, 128.

*Oil of Geranium—Detection of Fixed Oils.*—Pure oil dissolves in 2 to 3 vols. of alcohol of 70 vol. per cent. at 20° C. In the presence of small quantities of fixed oils the mixture is turbid, and milky with larger quantities.—Chem. News, 1892, lxv, 11, from Zeits. Analyt. Chem.

*Oil of Lemon-grass—Botanical Source, etc.*—This oil is derived from *Andropogon citratus* of De Candolle; Syn., *A. Schoenanthus*, Wallich; a large, coarse, glaucous grass cultivated in various islands of the Eastern Archipelago and in gardens over an extensive tract of country in India.—J. Ch. Sawer, Chem. and Drug., July 25, 1891, 126.

*Oil of Ginger-grass or "Geranium"—Botanical Source, etc.*—This oil

is derived from the leaves of *Andropogon Schoenanthus*, Linnæus; Syn.: *A. Martini*, Roxb.; *A. nardoides*, Nees; *A. pachnodes*, Trinnius; *Cymbopogon Martini*, Munro; and *A. Calamus aromaticus*, Royle. The oil is known in commerce under a variety of names: in England, oil of ginger-grass, Turkish oil of geranium, Rusa-grass oil, oil of Nimar. In the Balkan it is known as essence of geranium and oil of palma-rosa; in India it is called Rusa-oil, roshel, rusa-ka-tel; in Egypt, Arabia and Turkey it is known as Idris-Yaghi. The grass is found growing wild in the northern and eastern provinces of India; it yields about 6 per cent. oil. Its odor at first recalls that of rose, but this is soon followed by a strong odor of lemon; by rectification it is rendered perfectly colorless, and the odor of lemon is less marked. In Turkey it is subjected to a special treatment, to render it more fit to mix with oil of rose; this consists in shaking it with water acidulated with lemon-juice, and then exposing it to the sun and air; by this process it loses its penetrating after-smell, and acquires a pale-straw color. Blondel states that the oil is largely adulterated in India, frequently to the extent of 20 per cent., with the oil of gurjun, and that on its arrival in Europe it is submitted to another adulteration with oil of turpentine. According to Dymock, some of the Indian oil is also adulterated with ground-nut, rape and linseed oils.—J. Ch. Sawer, Chem. and Drug., July 25, 1891, 127.

*Lolium temulentum*, known as *darnel*, contains, according to Dr. P. Antze (*Centralbl. f. d. ges. Ther.*, May 1891), a volatile alkaloid, *loliine*, and a solid base, *temulentine;* the latter is probably a decomposition product of *temulentic acid*, for which he has determined the formula $C_{12}H_{12}NO_{19}$. The poisonous properties seem to reside in the acid and in temulentine, while after loliine has been given there is no reduction of temperature and no staggering.—Am. Jour. Pharm., 1891, 568.

*A Narcotic Grass.*—*Stipa viridula* of Trinius, var. *robusta*, is a variety common in New Mexico, and which has a most injurious effect upon horses and sheep who are so unfortunate as to feed upon it. Cattle who have once tasted it never again do so; but upon strange animals who do not avoid it, it acts as a strong narcotic or sedative. It is as poison to them, especially in the spring, when the blades first appear, causing a "profound sleep or stupor, lasting 24 to 48 hours, when the animals rally and give no evidence of bad effect." It is widely known and avoided by the natives as "Sleepy Grass." We read (in *Garden and Forest*) that the species *Stipa viridula* is much esteemed as a pasture or hay grass, and that it possesses none of the injurious qualities of the variety *robusta*.—Pharm. Record, 1891, 400.

## GUTTIFERÆ.

*Garcinia Mangostana*, Linné—*Rind of.*—By P. R. Liechti (Arch. Pharm., 229, 426–439). The author fully describes his method of prepar-

ing mangostin from the rind of Garcinia mangostana; it does not materially differ from that adopted by Schmid (Annalen, 93, 83; J. Chem. Soc., 1856, 190).—Jour. Chem. Soc., 1892, 205, 206.

*Mangostin—Properties.*—P. R. Liechti has reinvestigated mangostin, which was discovered several years ago by W. Schmid in the rind of the fruit of Garcinia mangostana. Pure mangostin, $G_{20}H_{22}O_5$, occurs in light-yellow, crystalline flakes, devoid of odor and taste, melting at 173° C. (not at 190° C., as stated by Schmid), to a yellowish liquid. It is soluble in alcohol, ether, chloroform, glacial acetic acid, carbon bisulphide, acetone, and concentrated sulphuric acid, but with difficulty in benzol, and not at all in petroleum ether. When its alcoholic solution is mixed with a little potassa, it acquires a splendid green fluorescence.—Chem. Zeitg. (Rep.), 1891, 257, from. Archiv Pharm., 1891, ccxxix., 426–439.

### HYPERICACEÆ.

*Hypericum perfoliatum—Coloring Matter of the Petals.*—According to K. Dieterich the petals contain two different coloring matters, a yellow and a red, both of which are soluble in alcohol. Petroleum ether extracts only the yellow color, which can be obtained from the alcoholic tincture by shaking it with the petroleum ether. On evaporation it remains as an oily, yellow mass which has all the properties of a fixed oil, and is readily saponified. The red coloring matter which is left dissolved in the alcoholic tincture, after removing the yellow color with petroleum ether, appears, when dry, as a beetle-green, nearly black, amorphous mass, the alcoholic solution in its shade reminds of carthamin.—Pharm. Centralh., 1891, 683; Chem. Zeit., 1891, 341.

### ILICINEÆ.

*Ilex Paraguayensis.*—An account is given of the histological structure of maté leaves in the Jour. de Pharm. et de Chim., 1891, 337, by M. Eugene Collin. He points out that by boiling the crude maté powder in alkaline solution, the structural details by which it can be recognized are easily brought into a condition to be observed under the microscope. These details, which are the subject of two excellent figures, do not, however, present any one feature peculiar to maté alone, but rather a series of characters by the combination of which it is distinguished from other similar leaves.—Phar. Jour. and Trans., 1891, 348.

*Ilex Paraguayensis*, St. Hilaire.—"Jesuit's Tea." Dr. Morong, in the Bulletin of Pharmacy, 1891, 549–554, describes this tree, and states that it is found in Eastern Paraguay, Brazil and Argentine Republic. He describes the manner in which the leaves are collected, cured and prepared for transportation. The common method of preparing and drinking the yerba tea in Paraguay differs from our custom in regard to the Chinese beverage. The same virtue that is attributed by the Indian of Bolivia to his coca

leaves is attributed by the Paraguayan peon to his tea. The leaves of Ilex Paraguayensis are employed as a drug in Paraguay, as well as for economical perfumes. Paraguay annually exports about 11,250,000 pounds of yerba to foreign countries, yielding a revenue of half a million dollars; and yet this great industry, which might be doubled or trebled with the greatest ease, is suffered to stand unimproved from sheer indolence. It requires a long process to prepare coffee or Chinese tea for the market under the most favorable circumstances. Yerba may be made ready for use in two days.

ILLECEBRACEÆ.

*Corrigiola telephiifolia*, Pour., "*False Pellitory Root.*"—A sample of pellitory root was forwarded to E. M. Holmes, curator of the Museum of the Pharmaceutical Society of Great Britain, by a wholesale herbalist in London, stating that it had been offered to the wholesale trade, but that there was some doubt as to its genuineness. The only feature noticeable at the first glance was the slightly paler color of some of the pieces, but on cutting a transverse section and examining it under a lens, it was noticed that some of the specimens possessed a structure entirely different from that of

FIG. 13.

**Anacyclus Pyrethrum.**

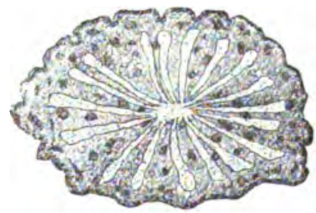
FIG. 14.

**Corrigiola telephiifolia.**

FIG. 15.

**Transverse Section of the Corrigiola telephiifolia, magnified.**

FIG. 15.



**Transverse Section of Anacyclus Pyrethrum, magnified.**

pellitory, and that it was quite possible to distinguish the spurious root by this means. Some of the pieces, however, so closely resembled pellitory root in general appearance (Figs. 1 and 2) that they might easily be overlooked. It seems desirable, therefore, to place on record the occurrence of the spurious root, and to point out the features by which it may be recognized.

The apex of the spurious root is generally crowned with small wart-like protuberances, such as frequently occur in senega root and in many of the *Caryophyllaceæ*; these are evidently the remains of the bases of slightly woody, slender stems. The transverse section of the root is of a yellowish-white color, with three to five opaque concentric rings (Fig. 15), each one alternating with a darker and narrower translucent horny ring.*

The taste is sweetish at first, leaving a slight tingling sensation, which recalls that of senega. The root possesses scarcely any odor. It is softer and more flexible than pellitory root.

In the root of *Anacyclus Pyrethrum* the structure is quite different.

The apex of the root is generally crowned with a tuft of short white hairs. The transverse section exhibits a single ring of radiating linear vascular bundles, which appear porous and of a yellowish color, the medullary rays and inner portion of the bark being of a creamy-white tint, becoming much darker or of a pale brown hue in badly dried pieces. Scattered over the surface, but much more abundantly towards the circumference of the section, may be seen yellowish-brown oil receptacles containing the odorous and resinous matters of the root (Fig. 16).

The identification of the root proved to be a matter of some difficulty, although its appearance seemed familiar. A section placed under the microscope showed no starch, nor did tincture of iodine manifest the presence of it.

Thinking, from its resemblance to dandelion root that it might possibly belong to the *Compositæ*, it was examined for inulin, but without result, nor were the laticiferous vessels observed in it, nor raphides.

I then sent a portion of it to Professor Radlkofer, of Munich, whose knowledge of the anotomy of the stems of plants is probably unequalled, asking him if he knew any plants of the natural order *Phytolaccaceæ* at all resembling it, for the roots bear a greater likeness to some species of *Phytolacca* than any other plant known to me. He was unable to identify it, but suggested a comparison with other known roots coming from the same district, if possible. Pellitory root being a native of northern Africa, it occurred to me that I had seen a root very like the spurious root in a collection of Morocco drugs presented some years ago by Dr. A. Leared (Pharm. Journ. [3], vol. v, p. 521). On examination of the roots in that

* In this character it recalls the appearance of dandelion root, but in that root the rings are interrupted, narrower and more spongy, and there is a well-marked woody centre of a yellow color and porous character.

collection it was found that the spurious pellitory was identical in appearance, structure and taste with the root called "towsergent' or "tauzarghente," which had been already identified by me as that of *Corrigiola telephiifolia*, Pour., belonging to the natural order *Illecebraceæ*. The fact that this little plant is glabrous, whilst *Anacyclus Pyrethrum* is hairy, explains the presence of the radical tuft of hairs on the apex of the one root and its absence from the other. Very little is known of the structure of the plants of the natural order *Illecebraceæ* or *Paronychiaceæ*, and that little refers chiefly to stems and not to root structure.

A brief account of the *stem* structure of *Corrigiola* is given in Ann. des Sciences Nat. ([4] tom. xiv, p. 117), but as pellitory root is rarely if ever used in a powdered state, and in an entire state the root of *Corrigiola telephiifolia* is easily identified, it is unnecessary to enter into histological details in the present note.—Pharm. Jour. and Trans., Nov. 21, 1891, p. 405.—Am. Jour. Pharm., 1892, 90–92.

### IRIDEÆ.

*Saffron.*—An examination of a number of samples of genuine saffron ascertained that the ash varied between 4.5 and 5.5 per cent., and that the moisture varied from 10 to 12 per cent. Attention is directed to the statement that saffron is frequently stored in damp places so as to increase in weight. In addition to a close inspection of this drug, the above determinations are helpful in determining adulterations (Cæsar & Loretz, Apotheker Ztg., 1891, 509).—Am. Jour. Pharm., Nov. 1891, 538.

*Safran Algeri* (extra) a French substitute for saffron, is an orange-yellow powder of faint saffron odor, soluble in water, producing a solution identical in color with one made from pure saffron; under the microscope small quantities of powdered saffron can be recognized. It is a mixture of Martius-yellow (dinitro-naphthol), and tropæolin N. 2, with a small quantity of saffron.—Am. Jour. Pharm., 1891, 567.

*Saffron Sophistication.*—By M. Collardot. (L'Union Pharm.) The author states that he has found specimens of saffron in which fine shreds of onions dried and colored have formed a considerable portion. He has also detected in samples of the drug as high as 70 per cent. of paprika, which had been previously treated with honey or some similar agglutinating agent.—Drug. Circ. and Chem. Gaz., 1891, 228.

*Crocus—Saffron.*—H. H. Hoffman. (Pharm. Era, Dec. 1891, 360.) Description, adulterations and tests for.

*Officinal Brazilian Irideæ.*—By Dr. Theodore Peckolt in Rio de Janeiro. (Pharm. Rundschau, 1892, 132, 133.)

### JUGLANDACEÆ.

*The Butternut.*—Geo. B. Sudworth considers the distribution of and the desirability of woods of various species of Juglans; also the history and domestic uses of the bark.—Harwood, i., No. 5, 3–5.

LABIATÆ.

*Hedeoma pulegioides, Pers.*—The following notes were compiled from the observations of Wm. A. Hague and from information obtained by him during the summer of 1890, from those who gather large quantities of pennyroyal in Belmont county, O., for the purpose of distilling the oil. The author states, as did Mr. J. F. Patton in a paper published in "Proceedings Penna. Phar. Assoc.," 1890, p. 88, that "it is one of the few herbs not subject to cultivation; it will not grow from the seed, nor can it be reproduced by transplanting. A field may one season be completely covered with the herb, and without disturbing the ground there may not be a single plant in the same field the next year." Prof. Maisch remarks that "the plant being an annual must obviously reproduce from the seeds; but it is possible that the hard seed-like akenes may sometimes remain in the ground for several years before germinating."

It is claimed that if there is too much rain the plant does not yield as large a percentage of oil as in moderately dry seasons, nor oil of as good quality. The apparatus used for distilling the oil is generally of the simplest construction, mostly "home made," and made portable, so that when the crop of one locality is exhausted the apparatus can easily be removed to another place. The yield of oil varies from 0.5 to 1.5 per cent., depending on the season and condition of the herb when gathered. – Am. Jour. Pharm., 1891, 477–479.

*The Chief Constituents of Oleum Pulegii.*—By Max Pleissner (Lieb. Ann., 262, 1–32.)—Berichte, 1891, 24, 303–305.

*Nepeta Glechoma*, Benth. (*Glechoma hederacea*, Linné).—The following are the results of an analysis made by Chas. A. Ridgway:

| | Per cent. |
|---|---|
| Volatile oil | .06 |
| Acrid fat melting at 53° | .96 |
| Caoutchouc | .38 |
| Wax | .66 |
| Resin and chlorophyll | 2.00 |
| Resin soluble in alcohol | 2.41 |
| Glucose | 2.49 |
| Saccharose | .40 |
| Mucilage | 5.18 |
| Tannin | 2.64 |
| Albuminoids | 4.08 |
| Moisture | 6.16 |
| Ash | 15.90 |

In experiments on the manufacture of the fluid extract, the best results were obtained by a menstruum of two parts of alcohol to one of water.—Am. Jour. Pharm., 1892, 66, 67.

*Oil of Lavender*, of English origin, contained 77.53 per cent. carbon

and 11.44 per cent. hydrogen; the very first portions of the distillate (15 mm. pressure) contained terpenes, among which *limonene* was identified; the principal fraction, 85°–91°, consists of an unsaturated alcohol, $C_{10}H_{18}O$, called *lavendol*, which has a specific odor, a density of 0.8672 at 20° C., and is lævogyre; at 97°–105° a fraction (about 10 per cent.) was obtained, which proved to be *lavendol acetate*, specific gravity of 0.8972 at 20° and lævogyre; higher boiling constituents were *sesqui-terpene* and other oxygenated products, to which in part is due the characteristic odor of the oil.

The physical and chemical properties of linalool, aurantiol and lavendol, which so closely agree, suggest that they are identical; while by reduction they yield aldehydes or ketones of the formula $C_{10}H_{16}O$, having the odor of *geranial* and from which they can not be positively distinguished. The alcohols, under various influences, retain their characteristic odor and certain physical differences, so that they at present cannot be considered as being identical. – F. W. Semmler and F. Tiemann (Berichte), Chem. Ztg., Rpt., 1892, 147; Am. Jour. Pharm., 1892, 306.

*Oil of Lavender.*—Schimmel & Co. found neither cineol nor camphor in oil of lavender, although the oil of Lavandula Spica contains considerable quantities of cineol. The chief constituent of oil of lavender is an alcohol, $C_{10}H_{18}O$ and its acetic ester. This alcohol boils at 197°–199° C., has a specific gravity of 0.869 at 20° C., rotatory power $[\alpha]_D = -10.35$ (100 mm.); refractive index for sodium light 1 : 64. On heating the alcohol with potassium bisulphate, or any dehydrating substance, a mixture of hydrocarbons is obtained, containing among others dipentene and terpinene. The acetic ester mentioned above, is remarkable because of its pronounced odor of bergamot; it is also found in the oil of bergamot to the extent of 40 per cent., and it is identical with linalool.—Pharm. Zeitg., 1892, 224.

*Oil of Lavender—Distillation in England.*—For an account of the lavender industry in England, the readers are referred to Am. Drug., 1891, 327, from Chem. Drug., Sept. 1891, 398–403.

*Oil of Spike—Purity.*—According to Schimmel & Co. the specific gravity of pure oil of spike is over 0.900; 1 part of the oil dissolves clear in 3 parts of alcohol (70 vol.-per cent.) at 20°C.; it is faintly dextrogyre. Apoth.-Zeitg. (Rep.) 1891, 115.

*Mentha Pulegium*—Linne.—The Spanish oil of Polei is a light yellow or green rather thick liquid, with an odor recalling that of peppermint. On fractionating the oil (62 grams), under the ordinary atmospheric pressure, considerable decomposition takes place; a small portion (3 grams), consisting principally of water, passes over below 212°, the principal portion (50 grams) between 212° and 216°, and a small quantity of a dark yellow liquid (4 grams) between 216° and 223°, leaving a brownish residue (5 grams).

A compound of the composition $C_{10}H_{16}O$, named by the author *pulegone*, can be isolated from the portion boiling at 212–216° by repeated fractional distillation under reduced pressure (60 mm.); it is a colorless liquid, of sp. gr. 0.9323 at 20°, boils at 130–131° (60 mm.), and has an odor recalling, but distinct from, that of oil of peppermint.

*Pulegoneoxime*, $C_{10}H_{19}NO_2$, can be obtained by treating pulegone with hydroxylamine in boiling alcoholic ethereal solution. E. Beckmann and M. Pleissner obtained also the hydrochloride, benzoyl and acetyl derivatives.

*Pulegoneamine*, $C_{10}H_{19}ON$, is obtained when the oxime is treated with hydriodic acid, and the crystalline hydriodide obtained in this way warmed with excess of the concentrated acid; it is a yellowish oil having a bitter taste and an amine-like odor, and it decomposes when heated. The hydrochloride was prepared, but only in an impure condition. They obtained the following derivatives: the benzoyl, methyl, platinochloride and also pulegoneamine phenylthiocarbimide.

An additive compound of the composition $C_{10}H_{17}BrO$ is deposited in colorless crystals when hydrogen bromide is passed into a well-cooled solution of pulegone in light petroleum.—Annalen, 262, 1–37; Jour. Chem. Soc., 1891, 936.—Am. Jour. Pharm., 1891, 550–552.

*Oil of Mentha Pulegium*, Linné—*The Principal Constituent of.*—M. Pleissner (Annalen 262, 1–37) obtained by distilling in vacuum an oil of boiling point 130–131° C. at 60 mm. pressure. It is colorless, specific gravity 0.9323 at 20° C; $[\alpha]_D = +22.89°$. The compound has the formula $C_{10}H_{16}O$, is isomeric with camphor, but differs in being a ketone, wherefore it was named *pulegone*. Among the bodies derived from this we have the monoxime, differing from camphoroxime in containing $H_2O$, which remains constant in all derivatives. By reducing the oxime the pulegonamine was obtained. Sodium in ether converts pulegone into left menthol, which was identified by the benzoate.—Am. Jour. Pharm., July 1891, 340.

*Oil of Mentha Pulegium*, L.—Barbier has obtained from this oil a compound isomeric with camphor, $C_{10}H_{16}O$, which he names "puleone." It is a colorless liquid of specific gravity 0.9482 at 0° C. and 0.9293 at 23° C.; the boiling point 222° C.; it is dextro-rotatory, and soluble in alcohol, ether and benzol.—Pharm. Zeitg., 1892, 238, from Comptes rendus, xciv., 126. (Compare Proceedings 1891, xxxix, 548, Rep.)

*Iodine Absorption of Peppermint Oils.*—Hugo Andres, to decide which of the several commercial varieties of peppermint oil is the best for medicinal purposes, made use of the iodine-absorptions. The iodine-absorption figures become smaller as the percentage of menthol increases, hence the oil with the smallest iodine-absorption figure would be the most valuable, since it is admitted that the active constituent of peppermint is menthol. From 0.4–0.8 of the samples were dissolved in 15 c.c. absolute alcohol

and an excess of Hübl's iodine solution added (to permanent red color) and allowed to stand for various periods of time (this to determine when the absorption was complete—it will be seen that there was no variation after 12 hours) and the excess of iodine titrated with standardized sodium thiosulphate; the absorbed iodine is calculated to 100 parts oil:

| | After Standing. | | | | |
|---|---|---|---|---|---|
| Variety. | 2 Hours. | 4 Hours. | 8 Hours. | 12 Hours. | 24 Hours. |
| English | 42.1 | 48.4 | 52.8 | 52.9 | No change. |
| German | 63.5 | 66.2 | 67.3 | 69.7 | 69.9 |
| American | 64.4 | 66.6 | 69.8 | 72.3 | No change. |
| Russian | 84.5 | 92.4 | 96.5 | 96.8 | " " |

To determine the effect of smaller quantities of turpentine oil as an adulteration on this test, some of the English and Russian oils used above were mixed with varying amounts of French oil of turpentine. The following figures were obtained after allowing to stand for eight hours with Hübl's reagent:

| Percentage of Oil of Turpentine. | English Oil. | Russian Oil. |
|---|---|---|
| 5 | 132.0 | 246.8 |
| 10 | 158.3 | 258.3 |
| 15 | 212.8 | 318.4 |

See Am. Journ. Pharm., 1890, 570.—Pharm. Ztschr. f. Russl., 1891, 417.—Am. Jour. Pharm., Sept. 1891, 459–460. (Compare former papers on this subject by Davies, Snow and Williams. Proceedings, xxxvii, 952; xxxviii., 579, 580, 582.)

*Adulterated American Peppermint Oil.*—A. M. Todd, in a letter published in the "Chemist and Druggist" (1892, 750, 751), refers to a so-called "Michigan oil of peppermint," which is again being offered in England under the same fictitious label.

*Oil of Peppermint—Distillation in England.*—For a detailed account of the peppermint industry in England, the readers are referred to Am. Drug., 1891, 325; from Chem. Drug., Sept. 1891, 398–403.

*Oil of Russian Mint and Menthylamine—Studies Upon.*—By Andres and Andreew. (Jour. Phys. Chim. R., t. xxii., 26; after Bull. Soc. Chim., 1891, 441.)—Jour. Pharm. Chim., 1892, 256–259.

*Influence of Menthol on the Gastric Functions.*—Being the results of Nikolai A. Vladimirsky, in an Inaugural Dissertation, St. Petersburg, 1891, No. 77, pp. 44; reprinted in Medical Chronicle, Aug., 367.

Following Professor I. T. Tchüdnosky's suggestion, Dr. Vladimirsky has carried out a set of experiments on seven healthy subjects (six men, including himself, and one woman), aged from 24 to 32, the drug being administered with food, in the dose of 0.3, 1.0 and 2.0 grammes. The author has arrived at the following conclusions:

(1) The drug (in any of the doses stated) very markedly diminishes the proportion of free hydrochloric acid in the gastric juice, the decrease attaining its maximum in about 1 or 1½ hours after the ingestion.

(2) In persons presenting a more or less weakened motor power of the stomach, the decrease lasts longer than in those with a normal one.

(3) The digestive power of the gastric juice is diminished.

(4) The transformation of proteids into peptones is retarded (hence an increased proportion of propeptones, *i. e.*, intermediary products of peptonization).

(5) The proportion of lactic acid in the gastric juice is augmented, the rise proceeding parallelly with diminution in the proportion of free hydrochloric acid.

(6) The motor power of the stomach grows weaker (in about one hour after the ingestion); in initial stages of the digestion, however, it may occasionally undergo some increase.

(7) The absorptive power of the organ improves, which seems to be dependent upon a favorable (stimulating) influence of menthol on the circulation.

(8) Contrary to the statements of Ossendowski (*vide* the Journal of Laryngology and Rhynology, May, 1890, p. 202), L. Braddon, M. Reichert, S. Rosenberg, Hugo Koster, and many other observers, menthol does not appear to possess any special "appetite-making" power.

(9) In 1 and 2 gramme doses, the remedy gives rise to a kind of intoxication, followed, in 4 or 5 hours, by sensations of languor and drowsiness.

(10) Menthol may prove useful as a substitute for camphor.—Am. Jour. Pharm., 1891, 496, 497.

*Menthol in Hay Fever.*—Dr. Lennox Wainwright (British Medical Journal, July 18, 1891), has found menthol, mixed with carbonate of ammonium and used as smelling salts, the most useful remedy in hay fever. The patients say that all irritability disappears, and in many cases they get no return of the symptoms.—Am. Jour. Pharm., 1891, 568.

*Menthol Wash for Pruritus.*—Menthol 1 drachm, alcohol 1 ounce, water 2 ounces, and diluted acetic acid 5 ounces. Apply with a sponge. Am. Jour. Pharm., 1891, 493.

*Micromeria—Muna Muna.*—It has a high reputation in Ecuador as an emmenagogue and uterine stimulant.—Pharm. Jour. and Trans., 1892, 878.

*Salvia Chian and Salvia Columbariæ.*—The family of Labiates furnishes few food plants to mankind. Only the Mexicans, among civilized people, use them to any extent as regular articles of diet. Chia is a name associated both with food and drink. The writer, Edward Palmer, has given some time in his botanical travels in Mexico to the investigation of

the several species of the genus Salvia which are commonly used both by the Indians and Mexicans in the various preparations of food and drink. S. Columbariæ and S. Chian are best adapted to cultivation, large crops of the species being grown and harvested with profit; the seeds being a staple article and in constant demand. He describes the preparation of the seeds as a food. One of the most refreshing drinks known is made by infusing the seed-like nutlets in water, which when sweetened and flavored with lemon-juice is especially grateful in the hot days of summer even to the sick, as it is easily borne by the most delicate stomach, and at the same time affords considerable nutrition.

*Hyptis suaveolens—"Chia Grande."*—The seeds are used in the same manner as the seeds of Salvia, developing apparently even a greater quantity of mucilage. A tea made from the roots of Hyptis suaveolens is used to purify the blood, and is also used as a remedy for the diseases of women.—Zoë, ii., 1891, 140–142.

*Oil of Sage—Toxicity.*—According to Cadeac and Albin, oil of sage is more toxic than oil of absinth, giving rise to attacks of epilepsy.—Am. Jour. Pharm., July 1891, 351; from Soc. de Biologie, April 1891.

*Thymus vulgaris.*—Common thyme, which was recommended in whooping-cough three or four years ago by Dr. S. B. Johnson, is regarded by Dr. Neovius (The Lancet, May 9, 1891), as almost worthy the title of a specific, which, if given early and constantly, invariably cuts short the disease in a fortnight, the symptoms generally vanishing in two or three days. He gives from one ounce and a half to six ounces per diem, combined with a little marsh-mallow syrup. He never saw any undesirable effect produced, except slight diarrhœa. It is important that the drug should be used quite fresh.—Am. Jour. Pharm., 1891, 568.

*Thymol.*—A Claus and E. Krause describe *ortho-bromothymol*, *ortho-bromothymolparasulphonic acid*, and *bromothymoquinone*.—Journ. Chem. Soc., Aug. 1891, 899; from J. pr. Ch. (2), xliii., 344–355.

## LAURINEÆ.

*The Camphor Tree in the United States.*—Abstract from Medical Times.—Drug. Circ. and Chem. Gaz., 1892, 106.

*Camphor—Collection in Formosa.*—Consul Warren states that the trunk is scraped and chipped to as great a height as the workmen can reach. The scrapings are pounded up and boiled in an iron pot, on which is inverted an earthenware cover specially made for the purpose. The camphor sublimes and is condensed in the cover. The root of the tree and about eight feet of the trunk contain, as a rule, the greatest quantity of camphor. If the scrapings yield well, the chipping is continued until, in the end, the tree falls; if the first scrapings do not yield well, the tree is abandoned. The roots are then grubbed up, and operated on.—Canadian Ph. J., July 1891, 180; Am. Drug., Aug. 1891, 239.

Edward Bedloe gives an interesting account of the vicissitudes of the camphor trade in Formosa, due to the prejudice of the governing classes against foreigners and everything foreign. He states that notwithstanding the fact that the camphor trees count by the million, the output of the entire island in 1890 was only 60 tons; he states, further, that a tree is not considered to be worth anything for camphor purposes until it is 50 years old. - Am. Jour. Pharm., 1892, 36–40.

*Camphor.*—According to the Scientific American, the Japanese have introduced the necessary machinery for the refining of camphor.—Am. Drug., 1892, 8.

*Camphor—Melting and Boiling Points.*—F. Foerster finds that sublimed camphor contains a small quantity of impurity, and that for the determination of its rotatory power high temperatures must be avoided in its preparation, and the camphor twice recrystallized from 50 per cent. alcohol. It then melts at 174.8°–175.3° C., and after six crystallizations at 176.3–176.5° C., and after ten crystallizations the solidifying point was found to be 178.7° C. by Landolt's method. The boiling point of the purified camphor was 209.1° C. under 759 mm.—Yearbook, 1891, 85, from Ber., xxiii., 2989.

*Camphor—Estimation.*—F. Foerster estimates camphor in several commercial substances (for instance, celluloid, etc.) by distilling with soda solution, when the camphor readily passes over. This may then be extracted with benzol, and the specific rotatory power of the benzol solution ascertained. Detailed instructions and tables of rotation of camphor-benzol solutions at different concentrations and temperatures are given.—Yearbook Pharm., 1891, from Ber., xxiii., 2981.

*Camphor—Hygroscopicity.*—Errera and Clautrian have found that camphor absorbs water from the air (40 gm. absorb 0.054 gm. at 16° C.). The absorption appears to be a merely physical phenomenon, since the condensed moisture is readily removed.—Pharm. Journ. Trans., Oct. 1891, 268, from Ber., 1891, xxiv., 2612.

*Camphor—Hypodermically.*—C. Rosner recommends to dissolve it in paraffin oil (about 1 : 4); it is sufficiently fluid, and keeps well.—Pharm. Centralhalle, 1891, 491, from Deutsche Med.-Ztg.

*Camphor in Consumption.*—Good results are reported from Berlin as attending the use of hypodermic injections of camphorated oil (1 : 10) in the treatment of phthisis, hæmoptysis and bronchitis.—Chem. Drug., Aug. 1891, 342.

*Compounds of Camphor with Aldehydes.*—A. Haller has found the following process to yield good results (*Compt. rend.*, ciii., 22): Dissolve 15 gm. sodium in a solution of 150 gm. camphor and 400 gm. toluol, allow to cool, pour off the liquid, wash the crystals of sodium camphor with a little benzol, and then heat with 100 gm. toluol and 105 gm. benz-

aldehyde; after washing with water the oily liquid contains toluol, camphor, borneol, borneol benzoate and *benzal camphor* (dextro); the latter melts at 95° C. Lævocamphor yields lævo-benzalcamphor, having identical properties except behavior with polarized light. A mixture of equal parts of the two is inactive and melts at 78° C. Analogous crystalline compounds have been obtained as follows: *Cuminalcamphor* $C_{20}H_{26}O$, melting point 62°; *methylsalicylalcamphor*, m. p. 93°; *ethylsalicylalcamphor*, m. p. 65°; *cinnamalcamphor*, $C_{19}H_{22}O$, boils at 280° to 290° C.—Am. Jour. Pharm., 1892, 30.

*Camphorone.*—By W. Koenigs and A. Eppens (Ber., 25, 260–269).—Abstr. in Jour. Chem. Soc., 1892, 626, 627.

*Action of Formic Ether upon Camphor.*—By Claisen (Sitzungsber. d. math. phys. Klasse d. k. bayr. Akad. d. Wissensch., 1890, 445–479).—Berichte, 1891, 24, 86–88.

*The Hygroscopic Behavior of Camphor and Thymol.*—By G. Clautriau.—Berichte, 1891, 24, 2612–2614.

*Camphene—Chemistry.*—S. E. Marsh, M. A. Balliol, and J. A. Gardner give the results of their researches on the preparation, products of oxidation, and substitution derivatives; and state that the derivatives of camphene should be as fruitful a subject of study as have been those of benzene.

*Production.*—The authors follow in the main the method of Wallach as modified by Marsh and Stockdale (turpentine hydrochloride, acetate of potash, and acetic acid), but use a copper autoclave instead of sealed glass tubes; for heating they use a bath of pitch, which gives them a temperature of 250° C., without danger or other inconvenience.

*Oxidation.*—They oxidize camphene by heating 20 gm. in a matrass on a water-bath with 133 c.c. of nitric acid (sp. gr. 1.42) and 133 c.c. of water, after the first action slackens, a second 133 c.c. of acid is added, and the whole heated until red fumes cease to be evolved. The liquid is then evaporated to a small bulk, and allowed to crystallize, which crystals are recrystallized from ether. This is a new acid of the formula $C_{10}H_{14}O_6$, which they call *camphoic acid.* The crystals melt at 184-185° C., and on distillation yield the *anhydride of camphopyric acid* ($C_9H_{12}O_3$); the anhydride, dissolved in hot soda, on addition of hydrochloric acid yields *camphopyric acid*, $C_9H_{14}O_4$; and *isocamphopyric acid.* Camphoic acid, being tribasic, completes the series of acids derived from camphor:

Campholic, monobasic—$C_{10}H_{18}O_2$.
Camphoric, dibasic—$C_{10}H_{16}O_4$.
Camphoic, tribasic—$C_{10}H_{14}O_6$.

The authors, further, investigate the action of phosphorus pentachloride on turpentine and camphene.—Journ. Chem. Soc., Aug. 1891, 648–654.

40

*Cinnamon — Cultivation of.*— By Miss Cummings. (Book entitled "Two Happy Years in Ceylon.") Drug. Circ. and Chem. Gaz., 1892, 127.

——— *Adulterations.—Powdered Cinnamon* is frequently adulterated with powdered sugar, from 10 to 16 per cent. having been found; the object of the adulteration being to disguise the bitter and sharp taste of inferior grades.—P. Soltsien; Pharm. Ztg., 1891, 600; Am. Jour. Pharm., Nov. 1891, 539.

*Oil of Cassia—Purity.*—Schimmel & Co. recommend to buy this oil on the guaranteed aldehyde strength, which they estimate as follows: 10 c.c. of the oil are measured with the pipette, and allowed to run into a specially manufactured flask of 100 c.c. capacity, with a neck 13 cm. long and 8 mm. internal width, which is divided into tenths up to 6 c.c., the last drops being blown out of the pipette with the mouth. The flask is then about three-fourths filled with a 30 per cent. solution of sodium bisulphite, and the contents thoroughly mixed by shaking. It is then warmed on the water-bath until the curd formed is completely dissolved, and there floats on the solution a layer of oil. After cooling, the flask is filled up with bisulphite solution (toward the end, drop by drop), till the oil has entirely risen into the neck of the flask, and its lower limit accurately coincides with the lowest mark on the neck. This portion consists of the non-aldehydes, the volume of which, subtracted from the 10 c.c. oil used, shows the amount of cinnamic aldehyde contained. Strictly speaking, these are volume p. c. and not weight p. c.; as, however, the specific gravity of the non-aldehydes in oil of cassia (1.060 at 20° C.) almost exactly accords with that of the oil itself (1.059–1.061 at 20° C). the slight difference may be disregarded.

Appended are the results obtained with several commercial samples:

| | | | | | | |
|---|---|---|---|---|---|---|
| Cheong Loong, | 1.061 | sp. gr. | 8 | p. c. soft residue, | 77 | p. c. aldehyde. |
| " | 1.061 | " | 6 | " " | 77 | " " |
| Yan Loong, | 1.858 | " | 8.5 | " " | 78 | " " |
| " | 1.060 | " | 7 | " " | 77 | " " |
| Ye Tak, | 1.062 | " | 18 | " hard residue, | 45 | " " |

An oil yielding less than 70 p. c. of aldehydes is suspicious, and if the residue left on distillation amounts to over 10 p. c., and is firm, it has been adulterated with hard resin; if it remains liquid, after cooling, fatty oils or other liquid adulterants have been used. Cinnamic acid will be estimated as cinnamic aldehyde; as, however, less than 1 per cent. of it is to be found in even very old oil, it will not invalidate the result.

Later, Schimmel & Co. have simplified the test by adding the bisulphite solution in small quantities at a time, waiting until the curdy mass has liquefied before adding the next portion. In this way the whole operation is finished within 15 minutes, against one hour or more.— Am. Journ.

Pharm., 1891, 44, and Pharm. Rundschau, N. Y., 1891, 274, from Schimmel & Co., Berichte.

*The Oils of Cinnamon Leaves and Roots.*—The oil of the leaves consists essentially of eugenol, with traces of cinnamic aldehyde and small quantities of terpenes. The oil of the roots contains a large quantity of eugenol, considerable quantities of terpenes and safrol, and a minute quantity of benzaldehyde.—J. Weber, Apotheker Ztg., 1891, 522; Am. Jour. Pharm., 1891, 540.

*Oleum Cinnamomi—From Leaves and Root.*—According to Prof. E. Schmidt (Chem. Zeit., 1891, 1376), the essential oil of cinnamon leaves consists of almost pure eugenol with a little terpene and cinnamic aldehyde, while the oil from the root also contains eugenol and terpene, together with much safrol and benzaldehyde. Both of the oils therefore differ from the essential oil from the bark, which consists of cinnamic aldehyde and terpene.—Chem. Zeit., 1891, 1376; Phar. Jour. and Trans., 1891, 268.

*Oil of Cassia—Lead in.*—Mr. Ed. Hirschsohn (in Pharm. Post) examined twelve samples of oil of cassia, in eleven of which he found lead, probably as cinnamate of lead.—American Druggist, 1892, 64.

*Cassytha filiformis* contains an alkaloid which in its action resembles laurotetanine (which see), although it differs in the color reactions.—Pharm. Centralhalle, 1891, 486. (A description of this plant will be found in Proceedings 1877, 145.—Rep.)

*Haasia firma* and *H. squarrosa* contain an alkaloid which physiologically bears the same relation to laurotetanine (which see) as brucine does to strychnine.—Pharm. Centralhalle, 1891, 486.

*Hernandia ovigera* and *H. sonora* contain an alkaloid which shows reactions similar to those of laurotetanine (which see), but physiologically differs entirely from it. The same is to be said about the alkaloid from *Gyrocarpus asiaticus.*

*Massoyene.*—O. Wallach still maintains that massoyene does not exist in the massoya bark, but that the volatile oil contains a relatively large quantity of pinene, with limonene and perhaps dipentene.—Journ. Chem. Soc., Aug. 1891, 935, from Arch. Pharm., ccxxix., 116–120.

*Some of the Constituents of Paracoto Bark.*—By G. Ciamiacian and P. Silber.—Ber., 1891, 24, 2977–2990; Jour. Soc. of Chem. Industry, 1891, 1025.

*Lindera fericia*, Bl.—*The Essential Oil of Kuro-moji.*—By W. Kwasnick (D. ch. G., t. xxiv., 81; after Bull. Soc. Chim., 1891, 593).—Jour. Pharm. Chim., 1892, 259, 260.

*Oil of Sassafras—Artificial.*—Schimmel and Co. point out that most of the "artificial" oil of sassafras sold is not a synthetical product, but merely

a fractionation of crude oil of camphor. It shows a specific gravity of 1.070, whilst the pure safrol has a specific gravity of 1.108.—Am. Drug., 1891, 364.

*Tetranthera citrata* is supposed to be the plant which yields those false cubebs, formerly stated to be obtained from Daphnidium Cubeba. Tetr. citr. contains the poisonous alkaloid laurotetanine, which see.--Pharm. Centralhalle, 1891, 486.

LEGUMINOSÆ.

*Acacia Catechu, Willd.*—G. C. Bruce calls attention to a book in the Library of the Botanic Garden at Oxford, which apparently escaped the observation of the indefatigable authors of "Pharmacographia" entitled "Ehrenfridi Hagendornii Medicinæ D. et Pract. Gorl. Tractatus Physico-Medicus de Catechu sive Terra Japonica in vulgus, sic dicta ad normam Academiæ Naturæ-Curiosorum. Jenæ, 1679." This gives very interesting particulars respecting the history, nomenclature and physical characters of catechu.—Phar. Jour. and Trans., 1891, 553.

*Kath or Pale Cutch.*—A pale catechu prepared in the north-west provinces of India. Mr. Holmes suggested, and Mr. Morrow has shown, that a tincture of the catechin-free black catechu forms a stronger and more elegant pharmaceutical preparation than that made from a catechu containing catechin.—Phar. Jour. and Trans., 1892, 878.

*Preparation of Catechu in British Burmah.*—In the "Dictionary of Economic Products of India," Mr. Carter, Deputy Conservator of Forests in Tharawaddy, furnishes a description of the preparation of catechu in British Burmah. The process is also given in American Druggist, 1891, 302.

*Extraction of Catechin.*—By Dr. H. Gutknecht.—Chem. Zeitung, 1891, 959.

*Acacia digyna.*—Tari Pods, an Indian drug containing 33¼ per cent. of tannin.—Phar. Jour. and Trans., 1892, 878.

*Arachis hypogæa*, Linné.—During the year 1891, it is estimated by the Madras Times, November 19, that 100,000 tons of ground-nuts have been exported. There is a large and increasing trade in the oil between Pondichery and Rangoon and Moulmein. This oil has recently come into favor with the Burmese for cooking and other purposes. It appears that the methods employed by the natives in extracting the oil are very cheap, and if adequate European machinery could be erected, a very large saving would be effected by sending the oil alone, of which the seeds contain 43 per cent., to Europe. An attempt was made in Pondichery, and oil mills worked by steam pressure were started. Owing to the great expense of extracting the oil as compared to the native methods, the enterprise was a failure.—Pharm. Jour. and Trans., 1892, 656.

*Oil of Arachis—Detection in Olive Oil.*—See Olive Oil.

*Astragalus.*—By Prof. Planchon. (Jour. de Pharm. et de Chim., 1891, 473–479; 1892, 169–177; 233–237.) A consideration of the exudations of the genus.

*Gum Arabic and Substitutions—Analysis of Ash.*—S. Rideal and E. Youle have analyzed the ash of the various commercial gum substitutes, as follows:

| | Ash. | NaCl. | $K_2CO_3$. | $CaCO_3$. | $MgCO_3$. | Calcium Phosphate. |
|---|---|---|---|---|---|---|
| Aden | 3.29 | 0.29 | 17.2 | 53.9 | 29.48 | |
| Cap | 3.05 | 1.14 | 15.4 | 57.9 | 28.89 | |
| East Indian | 2.00 | 0.37 | 12.6 | 58.5 | 29.82 | |
| Senegal | 3.03 | 0.14 | 21.5 | 54.9 | 15.96 | |
| Eastern | 2.98 | 0.24 | 26.8 | 43.5 | | |
| Best Arabic | 3.01 | 0.94 | 24.2 | 57.25 | | |
| Good Arabic | 3.15 | 2.30 | 29.9 | 46.23 | | |
| Amrad | 2.24 | 0.14 | 7.39 | 67.2 | 16.62 | 4.86 |
| Ghatti | 2.45 | 0.25 | 7.8 | 53.5 | 8.4 | 33.8 |
| Dextrin | 0.12 | 15.1 | ........ | 6.45 | | 13.4 |
| Tragacanth | 2.8 | 1.14 | 11.9 | 76.3 | 8.89 | 4.74 |
| Australian | 2.09 | 1.91 | 3.21 | 20.8 | 0.45 | 65.9 |
| Brazilian | 1.39 | 0.46 | 17.74 | 11.8 | 0.45 | 67.14 |

—Chem. Drug., 1891, xxxviii., 788.

——— The gums which find their way into the English market from India, may be divided roughly into two classes, those which are entirely soluble in water, and exude from a species of acacia, of which amrad is the most important, and those which are not entirely soluble in water and are not exudations from acaciæ, known under the generic name of ghatti. Ghatti gum appears in somewhat dullish looking tears of a light brown color, associated with a number of fragments, which are white in color, and vermiform in shape; the latter consist generally entirely of metarabin. The amount of matter totally insoluble in water varies from 5 to 25 per cent. The mucilage given by any ghatti gum is decidedly more viscid than that from gum arabic, and can emulsify twice as much oil as gum arabic.

According to Rideal and Youle, reactions of gum arabic and gum ghatti in weak solutions are:—

| Reagents. | Ghatti. | Gum Arabic. |
|---|---|---|
| Ammonium oxalate | Slight turbidity. | Copious white precipitate. |
| Lead basic acetate | Slight precipitate. | Copious gelatinous ppt. |
| Ferric chloride | Slight darkening, gelatinous ppt. | No darkening, no gelatinous precipitate. |
| Borax | Gelatinizes. | Does not gelatinize. |
| Alcohol (equal bulk) | Slight ppt. | Copious ppt. |
| Mercuric chloride | White, stringy ppt. | No reaction. |

—Pharm. Journ. Trans., Sept. 1891, 190–192.

*Arabol Gum.*—A substitute. See under *Starch.*

*Gum Arabic and Gum Senegal.*—The employment of gum senegal as an adulterant of, or even as a substitute for, gum arabic, led the author to investigate the properties of these two gums.

Gum arabic forms rounded or angular colorless, yellowish or brownish, and strongly refractive little lumps: while gum senegal is usually in long, straight or curled cylindrical pieces, but occasionally in mulberry-shaped nodules, and is either colorless or faintly yellow or white, like etched glass, superficially, and lustrous and transparent internally. The two gums are, therefore, readily detected in the uncrushed condition, but under other circumstances they require further investigation for their identification.

Water dissolves both gums, leaving a residue of wood fibres, these being usually red if from gum arabic and black from gum senegal. Potassium hydroxide and copper sulphate produce a blue precipitate in both solutions; the gum arabic precipitate is more considerable than the senegal precipitate. Moreover, the former is coherent and rises to the surface, whereas the latter is more flocculent and remains disseminated in the liquid. The precipitates are only very slightly soluble on warming, and are not reduced even on boiling. Under similar treatment dextrin also gives a bluish precipitate insoluble in the cold, but soluble to a clear, dark-blue solution on warming, which solution is completely reduced by prolonged boiling. By heating with dilute potassium hydroxide for some time, solutions of gum arabic or dextrin become amber-yellow; solutions of gum senegal, on the other hand, scarcely alter, or are but very faintly yellow.

Mixtures of the gums arabic and senegal behave, with potassium hydroxide alone, like gum arabic; with potassium hydroxide and copper sulphate, like gum senegal. The blue precipitates from mixtures of dextrin with gum arabic or gum senegal are reduced on boiling, provided the quantity of dextrin is not too small, but when the latter is the case, after thoroughly warming, the precipitate must first be filtered off; then, on boiling the filtrate, reduction takes place if dextrin is present. When both gums as well as dextrin are present, the precipitate is washed, dissolved in dilute hydrochloric acid, and the gums precipitated by means of a large excess of alcohol; when settled, they are washed and examined by the above methods.

The examination of a sample of gum arabic may be conducted in the following manner: Dissolve the powdered substance in lukewarm water, examine residue—any gelatinous matter indicating foreign gums; treat the solution with excess of potassium hydroxide and copper sulphate, warm, filter, and examine for dextrin and senegal as described above.

Gum senegal has been stated to be more hygroscopic than gum arabic; but on drying at 105° the former lost 13.39 per cent., the latter 14.56 per cent., and on exposure to the moist atmosphere, the former reabsorbed 6.15, the latter 6.34 per cent. of water.—L. Liebermann, in Chem. Zeit., 14, 665; Pharm. Record, 1891, 271.

*Gum Arabic—Adulteration.*—A. B. Petrie reports an adulteration of gum arabic with rock-salt.—Am. Journ. Pharm., 1892, 329.

*Acacia.*—By H. H. Hoffman. (Pharm. Era, Nov. 1891, 265). Description, adulteration and tests.

*Gum Arabic—A Substitute for.*—(Mühlen und Maschinen Industrie Zeit.) The process of the manufacture of a substance from bran which possesses strongly adhesive properties.—National Drug., March 1892, 74.

*Arabol Gum.*—By F. M. Horn (Pharm. Post, 1892, 525, 526). An analysis was made, and it was found to be a manufactured and not a natural product.

*Arabol-gum* is an artificial product containing water, 15.12 per cent., ash 0.81 per cent., maltose 24.23 per cent., dextrin 54.48 per cent., starch 4.18 per cent., acidity expressed in percentage of KOH, 0.43 per cent. The following method gives a similar product: 100 gm. wheat starch are heated with 500 c.c. water containing 10 gm. oxalic acid in a water-bath at 90° C. for four hours, stirring occasionally; after neutralizing with powdered marble and filtering, the transparent yellow filtrate is evaporated and dried in a water-bath until the mass retains only 14 per cent. of moisture.—F. M. Horn, Pharm. Post, 1892, 525; Am. Jour. Pharm., 1892, 309.

*Cherry Gum—Properties and Use.*—Garros finds that cherry gum dissolves clear in water, which has been faintly acidulated with a few drops of sulphuric acid, and is rendered perfectly colorless by keeping the solution for about 25 to 30 minutes at 40° to 45° C. The mucilage possesses great sticking power, equal to the best commercial acacia. As to the dark-brown color of the natural gum, the author holds that it is due to the presence of tannin, which darkens on exposure to the light and air. Cherry gum differs from acacia chiefly in its behavior to concentrated sulphuric acid; on pouring a layer of a concentrated mucilage of acacia on top of sulphuric acid, an insoluble gelatinous mass results, whilst with cherry gum mucilage a saccharine substance is formed, which energetically reduces Fehling's solution and an ammoniacal solution of silver; it is colored brown by alkalies, and forms with phenylhydrazine acetate a difficultly soluble osazon.—Chem. Zeitg. (Rep.), 1891, 250; from Journ. Pharm. Chim., 1891, xxiv., 97.

*Gum Barks.*—David Hooper says that "Gum Bark" does not refer to the bark of a tree which exudes a gum by bruising or incision, but denotes a bark which has such mucilaginous properties that it could be used for special purposes in medicine and the arts, when the white of egg would be used elsewhere. He examined seven samples of gum barks from the Madura district of Southern India. Their origin was determined and chemical analyses were made.—Pharm. Jour. and Trans., 1891, 573, 574.

*Indian Gums for Pharmacy Work.*—Dr. S. Rideal and W. E. Youle have examined the numerous specimens of natural and artificial gums, and contributed a paper at the British Pharm. Conference, Aug. 1891, on the ghatti gums. They call attention to the discrepancies which have arisen concerning the true value of ghatti gums, and give directions for preparing a mucilage.—Chem. and Drug., 1891, 281.

*Kauri Gum.*—By J. C. Firth. Kauri gum is the sap of kauri trees growing in forests which decayed centuries ago. Kauri gum also exudes from living kauri trees. In this state it is known as the tree gum, new gum, or bush gum. It is highly prized in the making of varnishes, and for use in the arts. It is obtained in New Zealand by digging.—Pharm. Era, Aug. 1892, 105.

*Varnish Gums.*—James Stevenson has an article on this subject.—Pharmaceutical Era, June; Pharm. Journ. Trans., 1892, 1043.

*Balsam Tolu—Tests for Purity.*—According to H. Beckurts and W. Brueche, the only reliable tests at present are the carbon bisulphide test, the specific gravity, and the percentage of ash. The iodine, acid, saponification and ester numbers can only be of use with balsams containing more than 20 per cent. of rosin. The bisulphide of carbon test of Schmidt, mentioned above, will indicate the presence of as little as 5 per cent. of rosin. 0.5 gm. of the balsam is left in contact with 25 c.c. of carbon bisulphide for half an hour, shaking occasionally; the filtrate is allowed to evaporate spontaneously in a porcelain capsule. The presence of rosin is generally indicated by the peculiar odor; a few drops of concentrated sulphuric acid allowed to run into the solution on the residue colors the latter green. The authors found the specific gravity from 1.091 to 1.101; ash from 0.25 to 1.20; acid number from 106 to 138; ester number from 53 to 71; saponification number from 177 to 191; and the iodine number from 153 to 170.—Archiv Pharm., 1892, cxxx., 82.

*Balsam Peru—Tests for Purity.*—According to H. Beckurts and W. Brueche, the saponification number, iodine number, specific gravity, and the behavior to ammonia and hydrated lime, will suffice to determine whether a certain balsam is genuine or adulterated. Copaiva and Venice turpentine, balsam tolu and benzoin, will increase the acid number, whilst gurjun balsam and castor oil will lower it. The iodine number will be raised by rosin, benzoin, styrax, Venice turpentine, castor oil, copaiva, gurjun balsam, and balsam tolu.

The nitric acid test appears to be unreliable, or rather, too stringent, since of late have been found undoubtedly genuine balsams, which stood all the other tests well, but were colored by nitric acid (that is, the benzin solution).

The Ammonia Test.—The authors think that the diameter of the test-tube, the number of shakings (concussions), and the time within which a foam should be noticed, ought to be specified.

The iodine number does not appear hitherto to have been made use of. The authors find that the difference between the iodine number of balsam Peru and that of the usual adulterants is sufficiently great to afford a reliable indication. The iodine number of balsam Peru is between 38.01 and 41.59; rosin has 115.7: benzoin, 56.0; styrax, 143.6; Venice turpentine, 143.6; castor oil, 84.4; copaiva (Maracaibo), 160.0; copaiva (Para), 155.0; gurjun balsam, 150.0; balsam tolu, 165.0.

The authors found the acid number from 42.4 to 65.5; ester number from 155 to 206.8; saponification number from 218.2 to 259.6; and the iodine number from 38.01 to 56.30. On examining a mixture of a balsam with acid, 58.4; ester, 194.4; saponification, 252.8; and iodine, 41.6, with 10 per cent. of the following, the numbers obtained were:

| | Acid Number. | Ester Number. | Saponification Number. | Iodine Number. |
|---|---|---|---|---|
| Castor oil | 58.3 | 160 | 213.3 | 48.1 |
| Purified styrax | 55.4 | 169 | 224.4 | 53.0 |
| Copaiva | 58.2 | 177.5 | 235.7 | 59.8 |
| Balsam tolu | 72.7 | 173.2 | 245.9 | 50.5 |
| Venice turpentine | 48.5 | 180 | 228.5 | 56.6 |

—Archiv Pharm., 1892, ccxxx., 79.

*Balsam Peru.*—Dieterich received a lot which had the acid number, 56.0; ester number, 170.8; saponification number, 226.8.—Apoth.-Zeitg. (Rep.), 1891, 90.

*Cæsalpinia crispa.*—A cheap red coloring matter for tooth-powder can be made from brazil wood. A decoction is made from 100–150 grams of the wood, and to this is added 15–20 grams alum; the lake produced is sufficient to color one kilogram of tooth-powder.—Rundschau, 1891, 969; Am. Jour. Pharm., 1892, 2.

*Canavalia obtusifolia*, D. C.—By J. H. Maiden. A new substitution for Calabar bean.—Pharm. Post, 1891, 581, 582.

*Cassia holosericea*, Fresenius—*Aden Senna.*—A small variety of senna with hairy leaves. According to Mr. Moss, an infusion of the leaves produced a full effect upon a strong man, and caused no griping.—Pharm. Jour. and Trans., 1892, 874.

*African Copaiba—"So-called."*—During 1891, two consignments, at least, of a copaiferous (?) oleo-resin have been exported by the Niger Company from West Africa to the port of London. The substance has been offered, on several occasions, as balsam copaiba, without finding a bidder or purchaser at public auction. The appearance of such an import is interesting, inasmuch as several species of Copaifera are known to be indigenous to tropical Africa. Our botanical information relating to the

species yielding an oleo-resin similar to that of Copaifera is very scanty. It appeared desirable to John C. Umney, Pharmaceutical Chemist, to compare these African oleo-resins with the products of the South American species of Copaifera, with the object of determining their relationship or otherwise by physical and chemical characteristics. The two oleo-resins from West Africa were dissimilar in appearance; one was light-brown in color, slightly fluorescent, somewhat piperaceous odor, a specific gravity of 0.987 at 15° C., and on standing deposited a quantity of small crystals. The other was darker in color, more markedly fluorescent, possessed an aromatic, piperaceous, but slightly empyreumatic smell, and on standing, nearly half its bulk separated as an ill-defined crystalline mass. The specific gravity of the oleo-resin, thoroughly mixed, was 1.002 at 15° C., but after removal of the deposited mass, the fluid portion had a specific gravity of 0.992 at 15° C. The crystals obtained from each were found to have the same melting point (124° C.) and to be distinctly acid. These oleo-resins do not in their tests resemble gurjun balsam. That the two African oleo-resins are identical admits of little doubt, and their general characteristics resemble in most particulars the South American copaibas, the only commercial varieties with which we have been previously acquainted.—Pharm. Jour. and Trans., 1891, 449, 450.

*Copaiba—Estimation of the Volatile Oil.*—R. A. Cripps separates the volatile oil by applying live steam under pressure, which gives much quicker results than by heating the balsam by itself. His apparatus consists of a flask fitted with a safety tube and a tube bent twice at right angles. This tube passes through the cork of a second small weighed flask, reaching very nearly to the bottom. The small flask also carries a bent tube having a bulb blown in it, and joined by a rubber collar to another tube passing into a test-tube, the latter being partially immersed in cold water. Fill the large flask two-thirds full with water, and into the small flask introduce about 0.5 gm. of copaiba with 5 c.c. of water. Boil the water in the large flask, whereby a jet of steam will be driven into the smaller flask; as soon as the latter becomes about one-fourth filled with condensed water, apply a gentle heat by means of a spirit lamp. The volatile oil passes over into the test tube; the bulb serves to retain any minute portion of resin which might be carried over. After half an hour the small flask is disconnected and heated to 100° C. until dry, when it is weighed, and the tare of the flask deducted. Cripps found the following percentages of oil in commercial copaiba: 40.95, 45.0, 45.3, 46.4, 47.8, 48.2, 49.6, 50.4, 50.8, 53.3, 59.6. For illustration of the apparatus, see Ch. Drug., Aug. 1892, 282.—Pharm. Journ. Trans., Sept. 1891, 193.

——— *As Diuretic.*—Ivan N. Obolensky considers copaiba as a far superior diuretic to either digitalis, convallaria, corn-silk, calomel, or sparteine; acting very quickly in cardiac and hepatic cases, increasing the

urine from 700 or 800 c.c. to 2000 c.c. the next day.—Am. Drug., 1891, 295, from Brit. Med. Journ.

——— *Tests of Purity.*—H. Beckurts and W. Brueche have critically examined the tests of the German Pharmacopœia, and find that the specific gravity, the evaporation test, the behavior of the solution in carbon bisulphide to nitric and sulphuric acids, the ester, acid and saponification numbers, and, finally, the iodine number, are sufficient indications as to the purity or adulterations of the balsam.

——— *Specific Gravity.*—The authors think that adulterations with the following substances can be recognized more or less easily from the specific gravity: Oil of turpentine, (0.855–0.865); oil of sassafras, (1.070-1.090); rosin, (1.070–1.100); fixed oils, (0.910–0.930). On the other hand, adulterations with gurjun balsam, (0.955–0.975), and castor oil, (0.950–0.970), it will be quite difficult, and at times impossible, to suspect from the specific gravity alone.

——— *Evaporation Test.*—Copaiva, containing 10 per cent. of castor oil, yielded a smeary, resinous residue.

*Gurjun Balsam.*—The test with petroleum ether is decidedly unreliable. A mixture of one part of copaiva and gurjun balsam in five parts of petroleum ether deposited only a few flocky flakes, while with only five per cent. of gurjun balsam the deposit should be thick and bulky. As to the violet color of a solution in carbon bisulphide, when acted upon by nitric and sulphuric acids, the authors lay stress upon the instantaneous and purely violet color; a color reaction which appears after some time is of no significance.

——— *Water Test.*—Pure balsam, on shaking with water, separates into layers, a perfectly clear balsamic layer floating on top of the water. The authors consider the simultaneous appearance of foam as a suspicious sign.

——— *Acid Number.*—The number of pure balsam is between 75 and 100.

——— The *Ester Number* (that is, the difference between the acid and the saponification numbers) should not be higher than 10 (or 20?). There are to be found undoubtedly genuine balsams with or without ester compounds, and it would therefore be necessary to specify the highest allowable ester number. The iodine number might reasonably be put at between 140 and 160.—Archiv Pharm., 1892, ccxxx., 65–73.

*Copaiba.*—Dieterich found two lots of Maracaibo copaiba to give the acid numbers 77.28, 82.88; ester numbers, 7.0, 7.0; saponification numbers, 84.28, 89.8.—Apoth.-Zeitg. (Rép.), 1891, 90.

*Copaiba.*—By H. H. Hoffmann (Pharm. Era, Dec. 1891, 360). Description, adulterations and tests for.

*Coronillin—A Characteristic Reaction.*—As described by Schlagdenhauffen and Reeb (Jour. de Phar. d'Als.-Lorr., June, 1891), this glucoside

appears in amber-colored plaques, very soluble in water. less soluble in alcohol, and of a very bitter taste. It cannot be obtained in crystals. It contains no nitrogen, and appears to belong to the digitalin group. Like the latter, it is very toxic and a "heart poison;" it arrests that organ in systole. It is sensitive to sulphuric acid, with which it gives a brown coloration. But, as other organic substances give the same reaction, this acid can only be considered as sufficient to detect the presence of coronillin in alimentary substances. A characteristic reaction is the red coloration obtained by treatment with nitric acid to which cupric chloride has been added. With this, the quantity of .00025 gm. may be detected.—Am. Jour. Pharm., Aug. 1891, 402–403.

*Cytisine—Preparation and Reactions.*—The finely-crushed seeds of Cytisus laburnum were extracted with cold water, and the solution concentrated by freezing. The concentrated solution was then treated with normal lead acetate, and then with hydrogen sulphide; after the excess of the latter was removed by warming, soda was added to distinctly alkaline reaction, and the cytisine removed by chloroform. After repeated treatment with chloroform and ether the pure alkaloid was obtained. Cytisine, $C_{11}H_{14}NO$, forms colorless, odorless crystals, melting at 150–151.5° C. (uncorrected). It is a strong base, soluble in all proportions in water, alcohol and chloroform, insoluble in ether, light petroleum, carbon bisulphide, readily soluble in ethyl acetate. Dissolved in water it has a rotatory power of $[\alpha]_D = -120°$. On adding a solution of a ferric salt to the free alkaloid, or one of its salts, a red coloration is produced, which disappears on the addition of some drops of hydrogen peroxide solution, and is followed immediately on warming by a blue color. This is a very characteristic reaction, and will indicate 0.00005 gm. Phosphotungstic acid precipitates it in a dilution of 1 : 30,000; it is also precipitated by platinum and gold chloride, potassium mercuric iodide and iodized iodide, phosphomolybdic, tannic and picric acids. Of the salts the nitrate is the least soluble. For the detection of cytisine in poisoning cases, Dragendorff's method can be applied, advantage being taken of the solubility of the alkaloid in chloroform, and of the characteristic test given; the vomit and the urine should be first examined, salts of the alkaloid passing away in the urine within twenty-four hours. On comparing the composition and properties of cytisine and ulexine and their compounds, it was concluded that these two alkaloids were identical. - J. v. d. Moer and P. C. Plugge, Journ. Chem. Soc., Aug. 1891, 946, from Arch. Pharm. (2), xxix., 48–68.

*Dioclea violacea.*—In an article on the Leguminosæ of Ecuador and New Granada, M. Micheli mentions that the pretty purple flowers of Dioclea lasiophylla, Benth., a climbing plant which grows on the banks of the Magdalena river, which are produced between December and February, are exceedingly fragrant. Possibly these and other fragrant plants in South

America might yield new perfumes to European enterprise. Some months since, the flowers of *Chamædorea fragrans*, which have an odor like that of Marechal Neil rose, were sent to this country in small quantities from Bolivia, but there seemed to be a difficulty in obtaining them in commercial quantities (Jour. de Botanique, May, p. 188).—Pharm. Jour. and Trans., 1892, 1007.

*Erythrophlœine.*—The alkaloid of Erythrophlœum guineense, according to Prof. See, (La Méd. moderne), is about as poisonous as the amorphous digitalin of Homolle and Quevenne, and acts both upon the heart and lungs. The hydrochloride crystallizes, and is soluble in water. The medicinal dose, 1.5 to 2.5 gm. ($\frac{1}{40}$ to $\frac{1}{25}$ grain) does not produce any digestive disturbance, and modifies but slightly the condition of the heart, but renders respiration more easy.—Am. Jour. Pharm., 1892, 194.

*Eserine salicylate* is readily made from the sulphate by the following process: 100 parts eserine sulphate are dissolved in a suitable quantity of water, and an excess of a solution of sodium bicarbonate added and agitated with several portions of absolute ether; the ethereal solutions are filtered into a beaker containing 35.5 parts salicylic acid dissolved in ether, thoroughly mixed, and the eserine salicylate collected upon a filter, washed with absolute ether and dried, protected from sunlight and air. Any excess of salicylic acid that may have been present is removed by the washing with ether; the theoretical quantity of the salicylate is 106.5 parts; in practice this is a little too high. The success of this method depends upon rapid manipulation and preventing exposure to sunlight, otherwise the salt obtained will be of a red color due to the decomposition of eserine and formation of *rubeserine;* washing the crystals with alcohol will remove any red color, but with loss of eserine salicylate (P. Birkenwald, Pharm. Ztschr. f. Russl., 1891, 657).—Am. Jour. Pharm., 1891, 600.

*Glycine (Soja) hispida—Analysis of the Bean.*—Schulze, Steiger and Maxwell give the composition as follows:

| | |
|---|---|
| Water | 10.0 per cent. |
| Proteids | 37.5 " " |
| Fat | 18.0 " " |
| Cholesterin, lecithin, resin, wax | 2.0 " " |
| Dextrin | 10.0 " " |
| Cellulose | 5.0 " " |
| Starch | not quite 5.0 " " |
| Ash | 5.0 " " |
| Sugar, amides, etc., in small quantities. | |

The proteids consist of 30 per cent. soluble vegetable casein, 7 per cent. of insoluble casein, and 0.5 per cent. of albumin.—Chem. Zeitg. (Rep.), 1891, 256; from Landw. Vers.-Stat.

*Report on Commercial Goa Powders.*—By W. Duncan and T. S.

Tweedie. The purified article or so-called "chrysophanic acid" of commerce has almost entirely taken the place of the crude drug, but there is reason to doubt if the purified article possesses the same activity as an equivalent quantity of the crude drug. This opinion is supported by the statement of Martindale in the "Extra Pharmacopœia," 6th edition, p. 108.

For the last four or five years statements have appeared to the effect that the drug of the present time was much weaker than formerly, and contained less chrysarobin. This has been attributed to the Brazilians hewing down the tree (*Andira Araroba*) before it has reached maturity. It was while testing the value of this statement that the experiments, of which the results are given, were undertaken.

Chrysarobin is readily extracted by hot benzol, but the difficulties of using that solvent in a Soxhlet apparatus, decided the authors to use chloroform, checking the results by ether. In the "Extra Pharmacopœia" (p. 109) chrysarobin is said to be insoluble in ether. This was found to be erroneous. It is soluble in ether, but the authors cannot agree with the U. S. Dispensatory (16th edition, p. 433) that it is readily soluble.

Ten commercial samples of Goa powder were examined. These were

| Sample. | Chrysarobin per cent. | Moisture per cent. | Insoluble matter p. c. |
|---|---|---|---|
| 1 | 76.90 | 2.10 | 21.00 |
| 2 | 55.50 | 3.00 | 41.50 |
| 3 | 80.80 | 2.60 | 16.60 |
| 4 | 66.60 | 2.40 | 31.00 |
| 5 | 81.80 | 2.20 | 16.00 |
| 6 | 82.30 | 2.20 | 15.50 |
| 7 | 57.20 | 3.30 | 39.50 |
| 8 | 70.80 | 1.20 | 28.00 |
| 9 | 68.85 | 2.90 | 28.25 |
| 10 | 69.10 | 2.90 | 28.00 |
| Average | 71.00 | 2.50 | 26.50 |

obtained from different sources, in order that we might not have two of the same sample to examine. Four of these were in an unpowdered condition and mixed with pieces of wood. The others were in powder of various degrees of fineness. All were reduced to the same powdered condition, interfering in no other way by removing the wood or otherwise. As a rule those samples which were in broken lumps and appeared most inferior, yielded the best results.

The insoluble matter was not examined, but it appeared to consist mainly of woody tissue, and left a little ash on burning. From the above results it is evident that the statements as to the deficiency of commercial

Goa powder at the present time are not well founded, but that the present supply compares favorably with the drug originally imported.—Phar. Jour. and Trans., Jan. 2, 1892, p. 543.

*The Liquorice Plant as Found on the Banks of the Tigris and Euphrates.* —In a report on the trade of Bussorah, Consul Chenevix-Trench says: The great rivers of the Tigris and Euphrates, in the part where the liquorice root is found, flow through flat treeless prairies of uncultivated and nearly uninhabited land, capable with irrigation of producing any grain. For three months of the year hot winds blow, and the temperature reaches 104 degrees. For six months the climate is moderate and salubrious, and for three months bleak and wintry, the thermometer going down to 30 degrees at night. The liquorice plant is a small shrub, with light foliage, growing to about three feet high, invariably where its root can reach the water. It grows without any cultivation. No lands are leased for the purpose, and no objection is made to its being collected. It is found in abundance from Ctesiphon, 20 miles from Baghdad, down to Kut-ul-Anara, 178 miles—the latter place being half-way between the ports of Bussorah and Baghdad. It grows on red earth soil, and also on light, almost sandy soil, where the wood is best—provided it has plenty of water, and the ground is not more than 50 yards from the actual river or stream. The root when dug is full of water, and must be allowed to dry; this process takes the best part of a year, especially in hot weather. After it is dry, or during the process, it is sawn or cut into small pieces six inches to one foot long. The good and sound pieces are kept, and the rotten bits removed for fire-wood. A local tax of 10 per cent. is claimed by the Government, which may be taken in money or kind from roots cut from the Sultan's lands, and 20 per cent. from Government lands. It is then shipped in river native boats for Bussorah, where there is a wool hydraulic press. It is afterwards shipped in pressed bales to London, and again shipped from there to America, where it is used largely in the manufacture of tobacco. The trade is capable of expansion. The demand in America is great, and shipments are easily disposed of. - Phar. Jour. and Trans., Sept. 26, p. 247; Amer. Jour. Pharm., 1891, 547.

*Licorice.*—A writer in the "Scientific American," 1891, describes the methods which are successfully employed in England in the cultivation of the licorice plant.—Am. Drug., 1891, 245, 246.

*Licorice Root and Its Derivatives.*—The Department of State at Washington has recently instituted inquiries through our consulates in foreign countries, and from these sources a large amount of useful information has been gleaned. The bulk of the supplies brought to the United States are drawn from three countries, namely, Spain, Italy and Syria.—Pharm. Era, Jan. 1892, 37.

*Loco Weed—The Poisonous Principle of.*—By H. C. Oatman (Notes on

New Remedies, Aug. 1891, 14, 15). An alkaloid which the author was unable to crystallize, was obtained from the common fodder of the West, namely, Alfalfa (Medicago sativa).

*Loco Weed - A Further Report on.*—By Prof. L. E. Sayre (Notes on New Remedies, Dec. 1891, 29, 80). The author comes to the conclusion that "locoism" is not caused directly or indirectly by any poisonous substance ingested by the animal, but is, first, a congestion of the brain and spinal marrow (causing blindness and primary symptoms); and, second, softening to a greater or less extent.

*Lupinus angustifolius.*—The investigation of Hagen on the constituents of blue lupine, brought to light a new alkaloid, to which he gave the name "lupanine." C. Siebert has further examined the alkaloid with a view of ascertaining its correct formula and whether it possesses any near chemical relation to lobeline (Pharm. Jour., xxi., 162), to which prima facie it bears some resemblance (Archiv d. Pharm., ccxxix., 531). Siebert gives the formula for "lupanine," $C_{15}H_{24}N_2O$. Lupanine and lobeline have no close constitutional relationship.—Phar. Jour. and Trans., 1892, 609.

*Lupinidine from Lupinus albus*, Lin.—By M. Campani and S. Grimaldi (L'Orosi, 24, 19–24, and Gazetta, 21, 432–437). Lupinidine, when freshly prepared, is a pale-yellow, heavy, oily, alkaline liquid, with an extremely bitter and pungent taste; it is freely soluble in water and alcohol, but only sparingly in ether. If it is kept for a few days in a sealed tube, groups of white acicular crystals separate and gradually increase until the presence of the liquid is almost concealed. This is probably due to the presence of a crystallizable hydrated lupinidine, side by side with the anhydrous alkaloid. According to Bufalini, 0.5 c.c. of the solution of the hydrochloride causes death in frogs in a couple of hours, symptoms of general paralysis being previously induced. - Jour. Chem. Soc., 1891, 1521.

*Lupeol.* – A. Likiernik obtains lupeol from the husks and seeds of Lupinus luteus, by evaporating the ethereal tincture, and hydrolyzing the residue with alcoholic potassa, dissolving in water, and taking up the lupeol with ether. It forms long, colorless needles, which melt at 204° C., are insoluble in water, but readily soluble in chloroform, ether, benzol, and light petroleum. It answers to the formula $C_{26}H_{42}O$.—Yearbook, 1891, 67, from Ber., xxiv., 183–186.

*The Alkaloid of Sophora tomentosa, L.* (Am. Journ. Pharm., 1891, 231), according to a preliminary note by Prof. Plugge, is very likely to be proven identical with *cytisine;* the chemical as well as physiological tests with a small quantity of material gave all tests for cytisine.—Arch. der Pharm., 1891, 561; Am. Jour. Pharm., 1891, 603.

*The Tannin of Algarobilla and Myrobalans.*—G. Zölffel (Arch. Pharm., 229, 123–160). Two tanning principles are found in algarobilla: one, occurring to the extent of 8 to 10 per cent., is the glucoside of gallotan-

nic acid, and by hydrolysis yields gallic acid and dextrose; the other occurring in much larger quantity, is a sugar free tannic acid, which readily decomposes into ellagic acid, $C_{14}H_6O_8 + 2H_2O$. This new ellagotannic acid, $C_{14}H_{10}O_{10}$, has already been obtained in an impure form by Löwe, from the fruit of myrobalan and divi-divi.—Jour. Chem. Soc., 1891, 918.

*Poisonous Constituents of "Timbó."*—Timbó is the name given in Brazil to several plants such as *Serjania cuspidata*. St. H., *Serjania lethalis*, and *Paullinia pinnata* of the order Sapindacæ, and *Tephrosia toxicaria* and *Physalis heterophylla* of the order Leguminosæ, all of which are used for the purpose of stupefying fish. A decoction of the root is preferred as affording the more powerful poison. The material collected by F. Pfaff consisted of root and branches, without flower or fruit, and could only be identified as coming from a leguminous plant. He isolated *Timboïn* ($C_{27}H_{26}O_6$) a crystalline yellowish-white principle. Sobieranski considers it to be a chemically neutral, indifferent substance, and a nerve poison of the toxine class. It yields anhydrotimboïn. He also obtained an oily compound, *timbol*, probably poisonous, and occurring chiefly in the stem and branches of the plant.—Arch. Pharm., 229, 31–48; Jour. Chem. Soc., Aug. 1891; Am. Jour. Pharm., 543, 544.

## LICHENES.

*Lichen Islandicus ab amaritia liberatus* (Iceland moss, deprived of bitterness).—German Unoff. Form:

| | |
|---|---|
| Iceland moss, cut | 5 parts. |
| Solution of potassium carbonate | 1 part. |
| Water | a sufficient quantity. |

Upon the Iceland moss pour the solution of potassium carbonate previously diluted with 30 parts of lukewarm water, and macerate for three hours at a temperature of 15° to 20° C. Then pour the liquid off, wash the moss with cold water, and dry it.—Am. Drug., 1891, 376.

## LILIACEÆ.

*Alliaceous Plants and their Products.*—By P. L. Simmonds, F. L. S. (Am. Jour. Pharm., 1892, 328, 329.)

*Source of Cape and Natal Aloes.*—Cape aloes has hitherto been supposed to be derived from Aloe ferox, all authorities agreeing on this subject. Flückiger and Hanbury were the first to draw attention to a new kind of aloes exported from Natal, and therefore called Natal aloes, which is however unsuited for medicinal use. Last year the Bulletin of Miscellaneous Information, published by the director of the Royal Gardens at Kew, contained a notice that aloes, collected from Aloe ferox, was one of the exports from Greytown, the most northern port in Natal. Prof. Flückiger, upon request, received a specimen of this aloes, and upon ex-

amination found it to be absolutely identical with the Natal aloes formerly described by him and Hanbury in the "Pharmacographia."

Since the authorities at Kew believe that Mr. J. M. Wood, who reported Aloe ferox to be the source of this kind of aloes, has correctly identified the plant, and since it is unlikely that two so widely different species of aloes, the "Cape" and the "Natal," could be derived from one and the same plant, it remains to be seen whether "Cape" aloes is not derived from a hitherto undescribed species. – After Arch. d. Pharm., 229, 121; Am. Drug., 1891, 222.

*Aloes—Test.*—L. Schouteten states that aloes, in contact for 20 to 25 minutes with a concentrated solution of borax, gives a distinct green fluorescence, which, however, disappears after some time. As this reaction can be observed in dilutions 1 : 10,000, it would seem to be of practical use for the detection of aloes in mixtures.—Pharm. Zeitg., 1892; from Pharm. Weekblad.

*Aloin—Action.*—H. Meyer found that barbaloin acts best when given in combination with its own weight of sulphate of iron; nataloin he found as a rule inert in man, while in cats and dogs its action is certain. Subsequent experiments, however, proved that by living on an exclusive animal diet for some time, it acted well on man. Subcutaneously three-fourths of a grain of barbaloin (dissolved in sufficient formamide, which is the best vehicle), acts better than 2 grains given in pill.—Chem. and Drug., July 25, 1891, 114.

*Polygonatum biflorum*, Elliott.—According to Benjamin H. Gorrell, Jr., water is the best solvent for this drug, extracting 74.50 per cent. Of this, 15.70 per cent. was glucose, 18.40 per cent. of non-reducible sugar and .60 per cent. of mucilage. The remainder of the aqueous extract appeared to consist of sinistrin, and to this constituent is due the resemblance to squill. By a special examination of the sinistrin he found that it reduced Fehling's solution, and was not precipitated by saturated solution of barium hydrate. These properties, together with the physical one of "puffing up" when the solution was evaporated to dryness, exactly as does a solution of sinistrin from squill, confirmed the previous conclusions. Several samples of the drug were obtained from different sources, and all gave indications of containing sinistrin.—Am. Jour. Pharm., Aug. 1891, 385–386.

*Saffron—Adulterations.*—Cæsar and Loretz summarize the various adulterations of saffron as follows:

(1) More or less admixture of the bright styles obtained in the preparation of the selected saffron. (2) Mechanical coloring of the stigmas, and admixture with them of the colored worthless styles or of the red-tinted artificially rolled calendula petals. (3) Artificial moistening, to the extent of 15 to 20 per cent., which mostly is brought about by keep-

ing the saffron in damp cellars. (4) More or less ingenious "loading," partly externally, by means of a red-colored pasty mass, and partly by the use of saline solutions, which increase the weight 15 to 25 per cent. without perceptibly altering the external form of the drug, being taken up by the inner structure of the stigmas. All these adulterations can be recognized by a searching comparative examination, thus:

(1) By the bright color of the saffron, and the easily separated styles bearing no stigmas. (2) By its unnatural red color, and the failure in the imitation saffron of the characteristic form. (3) By the unusually moist feeling and soft consistence of the saffron and by the result of the determination of moisture. (4) By the particles which form the external weighting, and can be broken away from the drug by the peculiar brittle character of the article when dry or by the glycerin added to prevent this; also by the unnatural lustrous appearance of the saffron artificially weighted by saline solutions. A more reliable test is that of the estimation of ash. The natural moisture of a good saffron lies, say the authors, at the most between 10½ and 12 per cent., and the ash between 4½ and 5½ per cent. —Drug. Circ., 1891, 274, from Apoth.-Zeitg., 1891, 509.

*Saffron - New Adulterants.*—Collardot has detected the presence of fine shreds of onions dried and colored artificially, and also the powder of paprika (sweet cayenne).—Pharm. Jour. and Trans., Aug. 1, 1891, 85, from L'Union Pharm., July, 294.

*Saffron—Phosphoric Acid in the Ash.*—Pure saffron should not yield more than 8 per cent. of ash, which contains 13.53 per cent. of phosphoric acid, whilst the ash of safflower contains only about 2 per cent., and that of the flowers of calendula, 0.73 per cent.—Kuntze and Hilger, Chem. News, 1891, lxiv., 112, from Zeits. Analyt. Chem., 1891, xxix.

*Trillium erectum*, Linné.—Mr. Vivian I. Reid subjected the rhizome to an analysis with the following results: Besides the usual plant constituents, such as starch, tannin, fat, resin and gum, trillium contains a small quantity of fixed oil, saponin to the extent of 4.86 per cent., and an acid crystalline principle which is colored purplish-brown by sulphuric acid, and light-green with sulphuric acid and a crystal of potassium bichromate. It is suggested that this acid principle results from a decomposition of the saponin.—Am. Jour. Pharm., 1892, 67–69.

*Schoenocaulon officinale*, A. Gray—*The Fat and Essential Oil of the Seeds.*—Herr E. Opitz (Archiv, June 22, 265) has subjected sabadilla seeds to a thorough chemical examination, paying especial attention to the essential oil and fat. The yield from good fresh seeds is about 13 per cent. of fat and 0.32 per cent. of essential oil.—Phar. Jour. and Trans., 1891, 85.

*New Alkaloids from Cevadilla Seeds.*—E. Merck (Berichte, Jan. 1891, through Chem. Ztg., Rep., 1891, p. 48) has isolated two new alkaloids

from cevadilla, which he has named sabadine and sabadinine, and for which the following is characteristic. They remain dissolved when isolated by alkalies, carbonates and ammonia, but are precipitated on boiling the solution. *Sabadine* crystallizes from ether in short needles, and in the crystalline state is difficultly soluble in water and ether. The fusing point is 228–240° C., where decomposition takes place. On complete evaporation of the ethereal solution, the last portions remain as an amorphous mass, which gradually crystallizes. Concentrated sulphuric acid dissolves the alkaloid with a yellow color and a green fluorescence; this disappears as the liquid assumes a blood-red and then violet color. Sabadine is not sternutatory, and has the formula $C_{29}H_{51}NO_8$. *Sabadinine* crystallizes from ether in filiform needles, somewhat soluble in water and rather soluble in alcohol. At a higher temperature, decomposition takes place. Concentrated sulphuric acid dissolves the alkaloid with an unchangeable blood-red color. Sabadinine is not sternutatory, and possesses the formula $C_{27}H_{43}NO_8$ or $C_{27}H_{45}NO_8$.—Am. Jour. Pharm., July 1891, 338, 339.

*Veratrine—Decomposition Products.*—F. B. Ahrens confirms Bosetti's observation that on treating veratrine with an alcoholic baryta solution, the products are angelic acid and cevidine (see Proceedings 1883, xxxi., 279). He also confirms the statement of Wright and Luff that from the action of alcoholic potassa results the formation of tiglic acid and cevine, $C_{27}H_{43}NO_8$, but finds that angelic acid is first formed, and subsequently converted into tiglic acid. When boiled with strong hydrochloric acid, veratrine yields tiglic acid, $C_5H_8O_2$, and a crystalline ruby-red body, which is probably the hydrochloride of a new base. When oxidized with potassium permanganate, veratrine yields acetic and oxalic acids, while oxidation with chromic acid gives rise to the formation of acetaldehyde and carbonic acid.—Yearbook, 1891, 56; from Ber. xxiii., 2700–2707.

*Veratrine.*—Stransky finds that on distillation with alcoholic potassa cevidine and veratroine are formed, besides angelic and veratric acids. When distilled with aqueous potassa, the yellow resinous mixture of bases furnishes methylamine and a yellow oil with an odor resembling that of the homologues of pyridine.—Yearbook, 1891, 57; from Monatshefte, xi., 482–485.

*Veratrine—Reactions.*—For an explanation of the Roman numerals see under Chemistry. M. P. 180° C.; $C_{37}H_{53}NO_{11}$. The commercial veratrine is a mixture whose reactions, however, are decided enough to cause them to be easily and always recognized.

*a.* Soluble in 1500 parts of water. Readily soluble in alcohol and chloroform, but less so in ether, carbon bisulphide and alcohol. Turns litmus blue.

*b.* When treated with reagent XIII., veratrine balls together and assumes a yellow color, while the acid becomes fluorescent with a yellow-green color. By and by the solution turns red and loses its fluorescence.

*c.* Veratrine is taken up by reagent XIV without any change in color. After standing for a long time, however, the solution turns red (provided the acid used did not have a specific gravity less than 1.13). The red color will also be formed in dilute hydrochloric acid solutions if these be heated.

*d.* Heat some phosphoric acid in a water-bath in a porcelain dish, and then add some veratrine. A red color will be produced, and a smell reminding one very much of butyric acid will be evolved.

*e.* Sugar, if pure, when mixed with veratrine prevents the latter from being charred by reagent XIII. Fill a test-tube with reagent XIII. and then pour this out again, leaving only the walls covered with a thin layer of the reagent. Repeat this to insure that the test-tube be clean. Now scatter a few grains of a mixture consisting of veratrine and sugar in equal parts over the sides, and let stand after having rubbed slightly with a glass rod. The mixture will first become yellow, then reddish, and finally violet. On standing, the latter color will gradually fade to brown.

*f.* Many substances interfere seriously with these reactions of veratrine, so that it is not easy to detect the alkaloid in a mixture of various substances containing it. Water even interferes with some of them.—Pharm. Review, 1892, 64.

LINEÆ.

*The Coca Plants in Cultivation.*—These have formed the subject of a paper in "Teysmannia" by Dr. Burek, of Buitenzorg, Java, of which an abstract is to be found in the Pharm. Jour. and Trans., 1892, 817–819. The author concerns himself with specimens brought from Peru by J. de Jussieu, and those figured growing at Kew Gardens, Java, and the one figured as derived from the Calcutta Botanic Garden. The latter he describes as a new species (E. Bolivianum, Burek).

*Coca Leaves—Commercial Varieties of.*—Being some notes upon the Peruvian, Bolivian and Java coca leaves, by E. M. Holmes.—Pharm. Jour. and Trans., 1892, 874, 875.

*Coca Culture.*—An article upon coca culture, coca leaves, and cocaine. —American Drug., 1891, 213–215.

*A Cocoa Factory.* – In an attractively written and freely illustrated shilling book, entitled, "Cocoa: All About It," by Historicus, the author gives some interesting details concerning Messrs. Cadbury's great factory at Bournville, near Birmingham. The abstract is given in Chem. and Drug., 1892, 763, 764.

*Erythroxylon Coca,* Lamarck.—"Coca and its Therapeutic Application," by Angelo Mariana. He divides the subject into five parts:

1. Describes the botanical characters of coca, and also speaks of its culture and the mode of gathering it.

2. Its history; its properties and uses.

3. The physiological researches made in the domain of coca, devoting a special chapter to cocaine.

4. Its therapeutic application.

5. The various applications of coca (Mariana's).

This is a freely illustrated and interesting account of Erythroxylon. The writer seems to feel that the scientific principles of coca are complete, and therefore has summarized data regarding this therapeutic agent, with especial regard to the employment of preparations bearing his name. - Pamph., pp. 88, N. Y., J. N. Jaros.

*The Lines of Coca Leaves.*—By J. Moeller (Pharm. Post, 1891, 683, 684). The author has in his paper illustrated two sections, one through the leaf bud and the other through the expanded leaf. In the latter he finds an elevation due to Schwammparenchyma, covered by a small-celled epidermis. Nevinny showed that this consisted of collenchyma. It is not this, but a chlorophyll-rich parenchyma formed from the neighboring Schwammparenchyma through the dense combination of what is synonymous in the long direction of the leaf in the differently stretched cells. This is noticeable, and one can ascribe to it a mechanical function.

*Cocaine—Chemistry.*—A recapitulation of the chemistry of cocaine bases and their relation to atropine will be found in Apoth.-Zeitg., 1891, 429.

*Coca Bases.*—C. Liebermann refutes several of the statements made by O. Hesse in his "Study of Coca-leaves and their Alkaloids" (see Proceedings 1891, xxxix, 427), especially as regards the credit due to Hesse. He denies that Hesse is entitled to any other merit in clearing up the chemistry of the cocaine group than the one of having accidentally discovered an alkaloid accompanying cocaine, to which he ascribed a completely false formula and mode of decomposition. Liebermann claims the fact that he determined the correct formula and decomposition products, and hence came to the conclusion that all the non-volatile bases, accompanying cocaine, are constituted in a like manner from ecgonine, methyl alcohol and an aromatic acid. From the knowledge thus acquired, he and Giesel elaborated an easy technical method of preparing ecgonine from the valueless secondary coca alkaloids; and, after having learnt how to benzoylate ecgonine easily, that method led them to a technical synthesis of the base, which completely revolutionized the manufacture of cocaine.—Pharm. Journ. Trans., July 1891, 61.

——— Liebermann defends himself against the accusation of Hesse of having worked with impure substances, and therefore again asserts the correctness of his statements that the boiling point of alpha-truxillic acid is 274° C. (and not 266° C. as Hesse's cocaic acid), and that of beta-truxillic acid 206° C. (and not 201° C. as Hesse's isococaic acid), and also that the melting point of hydrated benzoylecgonin is 87° C. (and not 92° C., as Hesse asserted); they both found the melting point of the anhydrous

benzoylecgonine to be 195° C. Further he cannot consider homococaic acid and homoisococaic acid as well-determined substances; nor is Hesse's hygrine identical with the base which Liebermann has named hygrine.—Pharm., Journ. Trans., July 1891, 61.

——— O. Hesse replies that his cocamine is a pure, well-characterized base, whilst Liebermann's truxillin or isatropylcocaine must be considered a mixture. The formula of the air-dry cocamine is certainly $C_{38}H_{46}N_2O_8 + H_2O$; and as to the correctness of the melting points of cocaic and isococaic acids, he trusts that Liebermann soon will be able to verify them. Hesse does not consider the name truxilline (which Liebermann gave to the base which Hesse names cocamine) in order, because this base does not appear solely in Truxillo coca-leaves.—Pharm. Journ. Trans., Aug. 1891, 101.

*Reactions of Cocaine and Ecgonine.*—D. Vitali (L'Orosi, 14, 1–19) proposes the following test for cocaine: A trace of cocaine is placed in a porcelain capsule, ½–1 c.c. of sulphuric acid added, and solution of the alkaloid effected. To this is added iodate of potassium, or sodium, or iodic acid, in quantity equal to three times that of cocaine. If this mixture is slightly heated on a water-bath, light-green stripes appear; by continuing the heating the liquid becomes grass-green, and then dark-blue. On increasing the heat the liquid assumes a violet color, and violet vapors are given off. The reaction is said to be very delicate, as still 0.00005 gm. can be recognized. Other alkaloids show similar reactions with this reagent, which differ, however, in some respects from that shown by cocaine. Ecgonine does not show this reaction, which seems to be due to the benzoyl group, as benzoic acid is thus affected with the same intensity as cocaine. The difference between the alkaloids is shown by the following: Cocaine is dissolved in 2 c.c. concentrated sulphuric acid, and to this is added drop by drop an acid ($H_2SO_4$) solution of potassium permanganate, when a violet color appears, the solution on stirring becoming colorless. Ecgonine treated in like manner gives with the first drop a yellow color, and when more is added a violet color, which is more stable than that obtained with cocaine. Iodo-potassium iodide gives with cocaine round black globules, while with ecgonine it causes a yellowish-red precipitate, gradually crystallizing. This investigation was carried on with the ultimate intention of finding how cocaine behaves in the body. From the reactions with urine of a person who had taken cocaine inwardly it seems as if cocaine is fully decomposed in the human body, at least the urine did not even give the reactions for ecgonine.—Am. Jour. Pharm., July 1891, 340.

*Cocaine—Reactions of.*—Giesel, in 1886, proposed the following reaction for identifying cocaine: If 0.01 gramme cocaine hydrochloride is dissolved in 1–2 drops of water, and about 1 c.c. of a 3 per cent. solution of potassium permanganate added, a violet precipitate is produced at ordinary

temperatures. Lyons remarks that with solutions containing less than 1 per cent. of cocaine, crystals are only formed on evaporation. Mr. T. C. Stead, referring to the test, says that with aconitine, berberine, brucine, quinine, colchicine, cinchonine, emetine, gelsemine, codeine, morphine, physostigmine, pilocarpine, strychnine, veratrine, narceine, cinchonidine, and apomorphine, the reduction of the permanganate is immediate or occupies but a few minutes, whilst with hyoscyamine, atropine and caffeine, an indifference equal to that with cocaine is observed, but no precipitate of the permanganate of the alkaloid is formed. He considers this the best test for cocaine as yet published.—Phar. Jour. and Trans., 1892, 902, 903.

*An Alkaloid from Java Coca Leaves.*—By F. Giesel (Chem. Centr., 1891, ii., 488, from Pharm. Zeit., 36, 419, 420). From 20 kilos. of a small-leaved Java coca the author obtained 1 kilo. of cinnamyl-cocaine, whilst about three times this amount, besides some cocaine, remained uncrystallizable. From the mother liquors an alkaloid was separated as hydrobromide, which resembled dextro-cocaine. The salts of the new alkaloid are precipitated crystalline from quite dilute solutions by potassium dichromate. It occurs in the leaves in quantities up to 0.2 per cent., and is a constituent of the plant and not a product of decomposition.—Jour. Chem. Soc., 1892, 361.

*Cocaine—Modification of Ferreira's Test for.*—By G. Patein (Rép. de Pharm.)—National Drug., July 1891, 3.

*Cocaine – Test of Identity.*—Patein has modified Ferreira da Silva's test as follows: The substance containing cocaine is diffused in alcohol and a piece of potassa added, when on stirring the odor of benzoic ether will be readily noticed, even if only a few milligrams of cocaine are present.—Pharm. Zeitg., 1891, 435, from Répert. de Pharm.

*Cocaine—Reactions.*—For an explanation of the Roman numerals see under Chemistry. Use the hydrochloride, $C_{17}H_{21}NO_4HCl$. M. P., 182° C.; melts to a brown liquid, and develops a fruit-like odor.

*a.* Soluble in its own weight of water, less so in alcohol and chloroform, and does not affect litmus.

*b.* 1 c.c. of an aqueous solution (1 to 50) is made turbid by reagent II., but rendered clear by adding about 10 c.c. of the latter; if this be allowed to stand, cocaine will begin to crystallize. Reagent I. has the same effect.

*c.* 0.1 gramme of the salt will dissolve in 1 c.c. of reagent XIII., if slightly warmed, without change of color. If heated in a small test-tube, however, a sublimate of benzoic acid will be formed on the sides upon cooling.

*d.* If equal parts of cocaine hydrochloride and mercurous chloride are rubbed together, the mixture will turn black almost instantly when water or alcohol is added.

*e*. 0.1 gramme of the salt when sprinkled upon 1 c.c. of reagent XIX. causes the latter to assume a red color. In course of an hour this will change to green, owing to the reduction of the chromic acid to chromic sulphate.

*f*. A solution of cocaine hydrochloride (1 to 50) is precipitated by reagents IV., VII., VIII., IX. and XVII., but not by reagents X., XII. and XVI.

*g*. Reagent XVIII. causes a cloudiness to appear, which, however, vanishes as soon as 0.5 c.c. of the reagent has been added.

*h*. One drop of cocaine solution (1 to 50) tastes bitter and causes a feeling of numbness on the tongue.—Pharm. Review, 1892, 26.

*Cocaine—Tests.*—J. C. Stead has collected all the useful tests for the identity of cocaine salts, in so far as they can be applied easily by the pharmacist.

The soluble cocaine salts in aqueous solution give the following precipitates:

| | |
|---|---|
| Carbonates and hydrates of ammonia, the alkalies and alkali earths | white. |
| Borax | white. |
| Picric acid | yellow. |
| Tannin, in the presence of hydrochloric acid | white. |
| Mayer's reagent | white. |
| Thresh's reagent | brick red. |
| Iodine | brick red. |
| Stannous chloride | white. |
| Gold chloride | pale yellow. |
| Platinic chloride | yellowish flesh. |
| Mercuric chloride | white. |

They are not precipitated by bicarbonates, nor by tannin (by itself). The ordinary color reagents for alkaloids give no characteristic reactions. Cocaine, treated with an alcoholic solution of potassium hydrate, yields ethyl benzoate with characteristic odor. According to Flueckiger, vapors of benzoic acid are given off on heating cocaine or its salts with sulphuric acid (1.84). Schell remarks that a mixture of the hydrochloride with a small quantity of calomel, when moistened or simply breathed upon, blackens. Atropine gives the same result, but only on heating. The alkaloid does not answer to this test. Vitali dissolves the alkaloid in a little sulphuric acid in a porcelain capsule, and adds potassium or sodium iodate or iodic acid (about three times the weight of the alkaloid) when on slightly heating on a water-bath light-green streaks appear, then a grass-green coloration, and finally a dark-blue. As to de Silva's test, a peppermint, or rather citronella, odor is produced on evaporating a solution of the alkaloid or its salt in nitric acid (1.4), and then treating the residue with an alcoholic solution of potassa. Stead asserts that the odor is that of ethyl benzoate.

Mezger states that on dissolving 0.05 gm. of the hydrochloride in 5 c.c. of water, and adding 5 drops of a 5 per cent. solution of chromic acid, a distinct precipitate is formed, which, however, immediately dissolves; if now 1 c.c. of strong hydrochloric acid is added, a heavy yellow precipitate of cocaine chromate is formed. Mueller states that potassium bichromate precipitates the alkaloid from neutral solutions, while the (yellow) chromate does not. Stead has tried these chromate tests with other alkaloids, and finds that only gelsemine, strychnine and veratrine behaved similarly. Giesel's permanganate test Stead considers one of the best tests yet discovered. If 0.01 gm. of cocaine hydrochloride is dissolved in 1 or 2 drops of water, and about 1 c.c. of a 3 per cent. solution of potassium permanganate is added, a violet precipitate (of a double salt) appears, but no reduction of the permanganate. On applying this test to the other alkaloids, Stead found that whilst with hyoscyamine, atropine and caffeine an indifference equal to that with cocaine is observed, no precipitate of the alkaloidal double salt is formed. All the other alkaloids reduce the permanganate of potassium immediately, or within a few minutes.—Am. Jour. Pharm., 1892, 317; from Pharm. Jour. Trans., April 1892, 902.

*Cocaine Hydrochloride.*—According to O. Hesse, the hydrochloride of cocaine itself contains 1 molecule of alkaloid to 1 molecule of hydrochloric acid. It crystallizes from ice-cold water in colorless prisms, containing 9.5 per cent. of water of crystallization, and therefore corresponding to the formula $C_{17}H_{21}NO_4,HCl + 2H_2O$; but an anhydrous form occurs as a crystalline powder, when, for example, absolute ether, in which it is insoluble, is added to its solution in chloroform. According to Antrick it melts at 181° to 185° C.; according to Einhorn and Marquardt, at 181.5° C.; whilst my observations in Roth's apparatus correspond to 186° C. Minute impurities, almost defying detection, lower the melting point of the hydrochloride to about 180° C.

A very dilute solution of the hydrochloride gives almost immediately upon addition of ammonia a crystalline precipitate of cocaine. When the solution is more concentrated, however, a milky opaqueness first occurs upon the addition of ammonia, but the opacity soon disappears and crystals of cocaine are deposited. The resulting precipitate, as also that obtained with carbonate of soda, is anhydrous cocaine, an observation also recorded by Liebermann and Giesel, and not a hydrate of the alkaloid, as suggested by Squibb. Indeed, cocaine forms no compound with water, a fact inconsistent with the hypothesis of Liebermann and Giesel, who attempted to explain the peculiar behavior of cocaine to ammonia or soda by assuming that cocaine is at first precipitated by these reagents from its salts in an amorphous condition, and that the amorphous cocaine becomes more or less quickly crystalline, according to the concentration of the solution; passing through an intermediate soluble form. This property of cocaine is met with in many other alkaloids.

The aqueous solution of cocaine hydrochloride, which reacts neutrally, gradually acquires a slightly acid character when boiled for a considerable time under an upright condenser, or heated in a sealed tube to 120° C., though the amount of decomposition is very slight, even if the heating be long continued. But if hydrochloric acid be added to the solution, formation of benzoic acid occurs rapidly, and the decomposition continues until within a short time the whole of the cocaine has been decomposed. The same reaction is observed if a solution of cocaine in concentrated hydrochloric acid be allowed to stand at ordinary temperatures.

Upon mixing the aqueous solution of cocaine hydrochloride with a dilute solution of permanganate of potash, a purple-violet precipitate of permanganate of cocaine obtains, whilst the supernatant liquid also acquires a purple-violet tint. In a short time, however, both liquid and precipitate lose their color and dioxide of manganese is deposited. On the other hand, a solution of cocaine hydrochloride acidified with hydrochloric acid gives with bichromate of potassium a pretty precipitate, consisting of leaflets. Both reactions—the first discovered by Giesel, the second by Mezger, are of importance, since the first serves to detect an admixture of cinnamyl-ecgonine methyl ester and similar compounds, the second indicates the presence of cocamine and such bodies.—Am. Drug., July 1891, 215.

*Benzoylpseudotropeine, an Alkaloid of Java Coca-Leaves.*—C. Liebermann obtained benzoylpseudotropeine by decomposing its hydrobromide. He obtained the salts of the hydrochloride, platinochoride and the aurochloride.

Pseudotropine ($C_6H_{15}NO$) is obtained from the products of hydrolysis of the above base after the benzoic acid has been extracted with ether. He likewise obtained the salts of the hydrochloride, aurochloride and platinochloride.

C. Liebermann has synthetized benzoylpseudotropeine by heating pseudotropine (3 grams) with water (1.5 grams) and benzoic anhydride (1¼ mols.) on the sand-bath for 1¼ hours at the boiling point of the mixture. The synthetical base is entirely similar to the natural one.

He has no doubt that a series of pseudotropeines, corresponding to the tropeines, can be prepared from pseudotropine. He has prepared the following: cinnamylpseudotropeine; the hydrochloride. The picrate, platinochloride and aurochloride are similar to those of benzoylpseudotropeine.—Berichte, 24, 2336–2345; Jour. Chem. Soc., 1891, 1263; Am. Jour. Pharm., 1892, 44–46.

*Dihydroxyanhydroecgonin.*—By Alfred Einhorn and Berthold Rassow.—Berichte, 1892, 1394–1400.

*Benzoyl-eugenol* (benzeugenol) has lately been recommended, together with *cinnamyl-eugenol*, in the treatment of tuberculous affections. Benzeugenol crystallizes in colorless and odorless needles, neutral in reaction and

melting at 70.5° C. It has a faintly bitter taste, is almost insoluble in water, freely in hot alcohol, chloroform, ether and acetone. With concentrated sulphuric acid it gives the purple-red color characteristic of eugenol, which reaction distinguishes it from benzosol (a pale yellow color). Cinnamyl-eugenol forms shining needles, which are colorless, odorless and tasteless, neutral in reaction and melt at 90° to 91° C. It is scarcely soluble in water, but freely in hot alcohol, chloroform, ether and acetone. With concentrated sulphuric acid it gives a purple-red color like benzeugenol, but may be distinguished by the different melting-point. Both compounds are readily saponified with alcoholic potassa.—Pharm. Jour. and Trans., Aug. 1, 1891, 81, from Pharm. Centralh., 1891, 365; Am. Journ. Pharm., Aug. 1891, 406.

*Rules for the Administration of Cocaine.*—By M. Magitot. (Jour. de Pharm. et de Chim., July 1891, 14–20.)

*The Anæsthetic Properties of Cocaine.* — Dr. A. Bignon (Bull. gén. Thérap., 1892, 170) draws attention to a few peculiarities of cocaine. In slightly acid solutions the anæsthetic property of cocaine is rendered latent, but can easily be brought to its full force by neutralizing the acid with a base. The author states that the maximum intensity as an anæsthetic is shown when "all the acid is neutralized, the alkaloid cocaine being suspended in a slightly alkaline liquid." A liquid of this kind is prepared by neutralizing the acid with carbonate, not bicarbonate of sodium. 0.05 gm. of one of the salts treated as above has the same anæsthetic power as 10 centigrammes of the pure crystalline chlorhydrate of cocaine in solution. This alkaline suspension should be prepared at the time when the cocaine is to be used; it will not keep, as the alkaloid soon collects at the bottom of the vial, and can not easily be again suspended.—Am. Jour. Pharm., 1892, 229.

*The Action of Cocaine upon Blood Constituents* has been studied by Professor E. Maurel, who reported to the Académie des Sciences de Toulouse, Jan. 28, 1892, his conclusions. He states that in doses which do not affect the blood-corpuscles, the leucocytes are killed; this effect is produced by 0.10 to 0.20 gm. of the salt for 100 gm. of blood, equal to about 1 kilo. of body-weight. About 0.05 gm. of the salt causes changes in the leucocytes, but their vitality is not destroyed. Doses of 0.05 to 0.10 gm. of cocaine hydrochloride, repeatedly administered, are sufficient for killing the leucocytes of from 50 to 75 gm. of blood. The death of the leucocytes may account for some of the accidents which appear after such injections.—Am. Jour. Pharm., 1892, 230.

*Cocaine—Anæsthetic Properties.*—A. Bignon states that the maximum intensity as an anæsthetic is shown when all the acid is neutralized, the alkaloid cocaine being suspended in a slightly alkaline liquid. By neutralizing the acid with carbonate of sodium (not the bicarbonate), 0.05 gm. of

one of the salts has the same anæsthetic power as 0.10 of the pure crystalline hydrochlorate of cocaine. This alkaline suspension should be prepared at the time when the cocaine is to be used; it will not keep. Bignon states that acids do not destroy the anæsthetic property of cocaine, but merely render it latent.—Am. Journ. Pharm., 1892, 229, from Bull. Therapie, 1892, 170.

*Cocaine—Little Value.*—Germain Sée sums up his opinion of its usefulness as follows: As a remedy for pain, it is inferior to injections of morphine or antipyrine. In diseases of the stomach it fails. It is not a prophylactic against fatigue. As an antidote to the morphine habit, "it is not a triumph, but a martyrization of the human race." Acute cocaine poisoning is difficult to foresee, the poisonous dose being so variable, and the conditions not easily determined.—Am. Journ. Med. Sci., 1891, cii., 648, from Médecine Moderne.

*Linamarin*, a glucoside yielding hydrocyanic acid, present in the embryo of flaxseed, has been isolated by A. Jorissen and E. Hairs; it resembles amygdalin by yielding sugar and hydrocyanic acid in its decomposition by mineral acids and flaxseed-meal emulsions. Linamarin forms colorless needles crystallizing in groups, having a cooling and very bitter taste; ultimate analysis gives the following composition: C 47.88 per cent., H 6.68 per cent., N 5.55 per cent., O 39.89 per cent. The following points of difference are noted between linamarin and amygdalin: *Amygdalin* is soluble in twelve parts of water; by heating to 120° C. it loses water and melts with decomposition at 200° C.; concentrated sulphuric acid imparts a beautiful violet coloration; it contains 52.51 per cent. carbon and 3.06 per cent. nitrogen; amygdalin is decomposed by an emulsion of *sweet almonds*, also by an emulsion of *flaxseed-meal;* benzaldehyde is one of its decomposition products. *Linamarin* is soluble in an equal weight of water; by heating to 120° C. no water is eliminated; it melts at 134° C., and can be heated to 150° without decomposition; it is not colored by concentrated sulphuric acid; it contains less carbon and more nitrogen; linamarin is decomposed by an emulsion of *flaxseed-meal*, but *not* by an emulsion of *sweet almonds;* benzaldehyde cannot be found among the decomposition products.—(Jour. de Pharm. d'Anvers.) Pharm. Post, 1891, 659; Am. Jour. Pharm., Oct. 1891, 482.

*Linamarin.*—A. Jorissen and E. Hairs (Acad. roy. de Belgique [3], 21 [1891], 529), have isolated a glucoside, linamarin, from the germs of *Linum usitatissimum*. The germs, coarsely powdered, were treated repeatedly with boiling 94 per cent. alcohol, the latter recovered and the residue taken up with warm water. The resin and fat are separated and the aqueous solution treated with a slight excess of lead acetate. After filtration and precipitating the lead with $H_2S$, the liquid is evaporated to a syrupy consistency. This residue is extracted with boiling alcohol, the solvent recov-

ered for the greatest part, and the remaining liquid mixed with ten times its volume of ether under constant agitation. The residue remaining on distilling off the ether is taken up with water and this solution concentrated. Standing over sulphuric acid for some time, the concentrated solution is converted into a crystalline mass of linamarin. For purification it is again treated with ether and alcohol as above. Lastly, the principle is dissolved in two parts of warm absolute alcohol, and the solution cooled under agitation. The germs yield about 1.5 per cent. of the glucoside, which forms colorless needles possessing a refreshing but very bitter taste, is soluble in water and alcohol, but almost insoluble in ether. Concentrated sulphuric acid does not color it; dilute mineral acids decompose the glucoside into hydrocyanic acid, a fermentable sugar reducing Fehling's test, and a volatile compound possessing some characters of ketones, and giving with iodine and potassium hydrate, the iodoform reaction. Boiling barium hydrate liberates ammonia. Linamarin contains C 47.88 per cent., H 6.68 per cent., N 5.55 per cent., O 39.89 per cent.—Am. Jour. Pharm., Dec. 1891, 598.

## LOGANIACEÆ.

*False Angustura Bark.*—The substitution of the bark from a species of strychnos, as well as other barks, for the bark of the true angustura (Galipea Cusparia, St. Hilaire) has frequently occurred. W. J. Smythe assayed a specimen of the strychnos bark which had been placed in his hands for assay under the supposition that it was a specimen of the true angustura bark. Unfortunately the specimen was in the form of a powder, so that botanical identification was out of the question. He obtained, by these different methods, a mean indicating over 6.1 per cent. of total alkaloids. This alkaloidal principle was found to contain both brucine and strychnine.—Am. Jour. Pharm., 1892, 115–118.

*Brucea Sumatrana—Bitter Principle.*—The fruits of this plant, known as macassar nuts, are in high repute in tropical countries as a remedy in dysentery. F. Eyken has isolated the bitter principle by extraction with alcohol. *Brucamarin* forms colorless crystals, scarcely soluble in water, easily in alkalies, alcohol, chloroform and benzol; very little in ether and petroleum ether. It melts at 215° C., being decomposed. It contains nitrogen, and is colored violet by concentrated sulphuric acid, but not by nitric or hydrochloric acids. It is poisonous. It is colored brown already at 150° C. On heating it with soda solution a strong odor of tobacco will be noticed. It is not precipitated by tannin, iodo-iodide of potassium, or Mayer's solution; but by picric acid, platinic chloride, and argentic nitrate; also by subacetate of lead even in dilute solutions.—Chem. Zeitg. (Rep.), 1891, 331; from Tijds. Pharm., 1891, 276.

*Brucine—Reactions.*—For an explanation of the Roman numerals, see under Chemistry.

M. P. (*anhydrous crystals*) 178° C. $C_{23}H_{26}N_2O_4+4H_2O$.

*a.* Soluble in alcohol and in 150 parts of boiling water, from which it crystallizes on cooling.

*b.* A solution saturated at 15° C. contains about 1 part in every 1600 parts of water: it turns litmus paper blue.

*c.* Reagent XVI. causes no precipitate, reagent IV. only a slight one, as do also reagents VII., XVII. and XVIII.

*d.* By spreading a drop of reagent XIX. over a flat surface and allowing a drop of brucine solution to fall upon it, purple rings are formed, which, however, soon vanish.

*e.* Brucine dissolves readily in nitric acid, sp. grav. 1.05 or more, with a blood-red color which does not fade if an excess of the alkaloid be present, but if slightly warmed it becomes yellow.

*f.* On heating brucine with dilute nitric acid, or treating it with strong nitric acid, the solution finally becomes yellow and no longer gives any reaction for alkaloids; this is due to the fact that the brucine has been oxidized by the nitric acid, forming cacomelic acid.

*g.* Mercurous nitrate (Millon's reagent), also decomposes brucine, for when brought in contact with it on a porcelain surface in the presence of a little water, black mercurous oxide is precipitated, which, however, is again taken up upon stirring the mixture.

*h.* Dissolve 5 milligms. of brucine in 1 c.c. of water by adding to the latter 5 drops of nitric acid. Heat until the solution becomes yellow, then dilute with 9 c.c. of cold water and add 5 milligms. of sodium thiosulphate to the solution; this mixture will become brown at first, but very soon will turn to a beautiful amethyst color. If the yellow solution is neutralized, by adding calcium carbonate, for instance, the amethyst color is not produced by sodium thiosulphate until the solution is again acidified.—Pharm. Review, 1892, 8.

*Gelseminine.*—F. A. Thompson found several years ago in the rhizome of Gelsemium sempervirens, besides gelsemine, also gelseminine (see Proceedings 1887, xxxv., 118); W. C. Schmidt has verified Thompson's observation. It is easy to separate it from gelsemine, the hydrochloride of the latter being difficultly soluble, while the hydrochloride of gelseminine is easily soluble. It is liberated by ammonia in the form of a reddish light precipitate. Its reactions show it to be an alkaloid. The solutions of the hydrochloride possess a peculiar odor, reminding of cassie blossoms (Robinia Pseudacacia). Gelseminine gives with potassium bichromate a yellow, caseous precipitate, with bromine water a similar white one; no appreciable reaction with gallic acid, tannin, citric acid, ferric chloride, potassium ferrocyanide, sodio-potassic tartrate and Froehde's reagent. As a check the author isolated the alkaloid according to C. C. Fredigke's method (see Proceedings 1873, xxi., 654), and found it identical with the first one.—Pharm. Rundschau (N. Y.), 1891, 185.

*Strychnine.*—Investigation has shown that the compound named "strychnol" by Loebisch and Schoop (Am. Jour. Ph., 1888, 564), and previously described by J. Tafel as strychnine monhydroxide (1890), is not a phenol, but an imido-acid of the composition $C_{20}H_{22}NO(COOH):NH,4H_2O$; so that it may suitably be named *strychnic acid.* The substance of the composition $C_{21}H_{26}N_2O_4$, obtained by Gal and Etard (Bull. Soc. Chim., 31, 98) by heating strychnine with a solution of barium hydroxide at 130°, and named by them dihydro-strychnine, loses 1 mol. $H_2O$ at 135°, and has, therefore, the composition $C_{21}H_{24}N_2O_3+H_2O$; as it is isomeric with strychnic acid, and also gives almost all the reactions of the latter, it may be termed *isostrychnic acid.* Both these acids are formed when strychnine is treated with alcoholic soda at 100° or with barium hydroxide at 140°. J. Tafel has converted strychnic acid completely into strychnine. He also obtained the *nitrosamine hydrochloride; strychnic acid methiodide; strychnine methiodide; methylstrychnic acid methiodide;* also the methyl salt; a nitrous derivative ($C_{23}H_{29}N_3O_4Cl_2$). *isostrychnic acid;* the *hydriodide;* the *nitrosamine hydrochloride; isostrychnic acid methiodide; methylisostrychnic acid methiodide;* the *methyl salt;* the *methochloride; isomethylstrychnine; isodimethylstrychnine. Methylstrychnine* is highly poisonous and gives the same color reactions as strychnic acid.

J. Tafel's experiments have shown that the so-called hydrates of strychnine are isomeric imido-acids, that strychnine is an inner anhydride of strychnic acid, and that methyl and dimethylstrychnine are betaïne-like derivatives of this acid; the nitrogen atom in the $-CO-N\equiv$ group in strychnine is in direct combination with one benzene nucleus.—Annalen, 264, 33-84; Jour. Chem. Soc., 1891, 1262; Am. Jour. Pharm., 1892, 41-44.

*Strychnine—Bichromate Test.*—R. H. Davies has modified the well-known bichromate test, which is usually performed on a porcelain slab, so that it can be performed in a test-tube. Make a very dilute solution of potassium bichromate in concentrated sulphuric acid, and then add the solution containing strychnine. The first colors produced soon disappear, giving place to a reddish-orange which is fairly persistent, and it is possible to estimate the strychnine by a process similar to Nesslerizing, by comparison with the color of solutions of known strength.—Chem. Drug., March 1892, 446.

*Strychnine—Bichromate Reaction.*—Jul. Tafel calls attention to a little-known reaction which is suspiciously like the bichromate reaction of strychnine, and may easily be mistaken for the latter. The acid anilides behave to concentrated sulphuric acid in the presence of potassium bichromate as follows: Acetanilide, red violet; propionanilide, blood-red; benzanilide, violet; acetyl-o-toluidine, cherry-red, etc. Acetyl-p-toluidine, however, does not show this reaction.—Pharm. Centralh., 1892, 121; from Ber., xxv., 412.

*Strychnine—Separation from Brucine.*—Alfred Dohme calls attention to the simplicity and ease of Gerock's method for the quantitative separation of the two alkaloids, depending on the difference of their behavior towards oxidizing agents, in this case dilute nitric acid. (For particulars see Proceedings 1889, xxxvii., 702.)—Pharm. Review, 1892, 53.

*Acid Sulphate of Strychnine—Solubility.* - An hypodermic injection of acid sulphate of strychnine (1 grain in 40 minims of distilled water, according to Martindale's "Extra Pharmacopœia,") showing a considerable deposit of crystals, led George Coull to investigate the solubility of this salt. He found, as the result of numerous experiments, that the solubility was nearer 1 : 44.5 at 15.5° C., and recommends to make the injection 1 : 50, considering it undesirable to make such solutions saturated ones.—Pharm. Jour. Trans., April 1892, 846.

*Strychnine—Reactions.*—For an explanation of the Roman numerals, see under Chemistry.

M. P. 268° C. $C_{21}H_{22}N_2O_2$.

*a.* Soluble in about 6000 parts of water at 15° C. and 2500 parts at 100° C. Readily soluble in chloroform, but less so in alcohol and ether.

*b.* Strychnine and its salts are soluble in reagent XV., forming a yellow solution, and in reagents XIII. and XIV. without color.

*c.* Strychnine dissolved in reagent XIII. or phosphoric acid, is turned blue by adding chromic acid to the solution; the blue color soon changes, however, the liquid turning red. This same reaction is produced by dropping crystals of strychnine or its salts on reagent XIX., or by dropping crystals of potassium bichromate, or permanganate, upon a solution of the alkaloid in reagent XIII.

*d.* If strychnine be mixed with reagent XIII., and some oxide of cerium ($CeO_2$) in the manner stated in experiment *g*, under morphine, the mixture will assume a purple color which soon changes. Molybdic acid, titanic acid, tungstic acid or nitrate of bismuth, produce no color.

*e.* Nine parts of strychnine mixed with one part of brucine still give the above blue color with reagent XIX.; this color will not be produced if equal quantities of both alkaloids be taken, unless reagent XX. be substituted for reagent XIX. In the latter case the strychnine reaction still comes out very plainly.

*f.* If a mixture of the two alkaloids, brucine and strychnine, is suspected, it is simpler and surer to destroy the former by means of nitric acid, as given under brucine (which see), and then to test the residue for strychnine.—Pharm. Review, 1892, 49.

*Strychnine Nitrate—Reactions.*— For an explanation of the Roman numerals see under Chemistry.

$C_{21}H_{22}N_2O_2.HNO_3$.

*a.* Soluble in 90 parts of water and about the same amount of alcohol.

This solution is neutral in its reaction, and is readily precipitated by reagents IV., VII., VIII., IX., XII., XVI. and XVII. Reagent XVIII. produces a precipitate which is insoluble in excess of the precipitant, but soluble in excess of the original solution.

*b*. The precipitate of strychnine bichromate obtained with potassium bichromate is crystalline, and yields a purplish blue color very readily with reagent XIII.

*c*. If boiled with hydrochloric acid, strychnine solutions assume a beautiful red color.

*d*. To detect the nitric acid in the strychnine nitrate, the $FeSO_4 + H_2SO_4$ method will not answer. For this purpose diphenylamine answers better. Rub 10 milligms. of diphenylamine up with a little water and add 5 c.c. of reagent XIII. Spread this out and then add a few drops of the nitrate solution to be tested. A permanent dark blue color will at once be produced.—Pharm. Review, 1892, 64.

——— (Compare Proceedings 1887, xxxv., 326.) On treating strychnic acid with sodium nitrite and hydrochloric acid, in the cold, *nitrosamine hydrochloride*, $C_{20}H_{2?}NO\ (COOH) : N.NO\ HCl + H_2O$, is obtained; it crystallizes from alcohol in yellow prisms, is moderately soluble in cold water, and gives the nitroso reaction; on reduction with zinc-dust and acetic acid it is converted into a compound, which reduces Fehling's solution, but when warmed with tin and hydrochloric acid it yields strychnic acid hydrochloride. The author further describes *isostrychnic acid*, *methylstrychnic acid* and the several *methiodides*, and *methylstrychnine*, which latter is highly poisonous.

*Strychnine in Alcoholism.*—Dr. Ergloski recommends to use strychnine, not internally, but hypodermatically. He employs one-sixtieth to one-twentieth of a grain of nitrate of strychnine at each injection.—Am. Journ. Med. Sci., 1891, cii., 405, from Bull. Gen. Therap.

*Strychnine—Antidote to Snake-bites.*—Dr. Mueller recommends a solution of nitrate of strychnine (1 : 240), 20 minims to be injected every 10 to 20 minutes until slight twitchings of the muscles commence, showing that the snake poison has been rendered innocuous. Quite incredible quantities of strychnine can be injected with impunity. The injections have to be stopped as soon as the muscle symptoms appear.—D. A. Apoth. Zeit., Aug. 1891, 82, from Pharm. Journ. Trans.

### LYCOPODIACEÆ.

*Lycopodium clavatum.*—H. M. Whelpley gives the reported adulterations.—Bull. of Pharm., 1892, 107.

*Oil of Lycopodium.*—A. Barkowski obtained from the spores of Lycopodium clavatum 48½ per cent. of a neutral non-drying oil, very similar to almond oil. This oil contains 2 per cent. of a new fatty acid, lycopodic ($C_{16}H_{30}O_4$), 80 per cent. of oleic acid, a minute quantity of a vegetable

cholesterin similar to that obtained by Hesse from Calabar beans, 8.2 per cent. of glycerin and 3 per cent. of arachic, palmitic and stearic acids. The lycopodic acid crystallizes in little silky needles, it is double refracting like quartz, and appears to be isomeric with dioxystearic acid.—Drug. Circ. and Chem. Gaz., 1891, 155.

*Lycopodium Adulteration and How to Detect the Adulterants.*—By A. P. Micas (Pharm. Era, June 1892, 380).

LYTHRARIEÆ.

*Punica Granatum*, Linné.—*Fresh and Stale Pomegranate Root Bark.*—By M. De Vrij. The author examined the oft-discussed question as to whether the fresh bark is more active than the stale bark. Many believe the latter to be just as efficacious as the former, and De Vrij appears to adhere to this opinion. De Vrij recommends that the variety with white flowers should be cultivated as a tænifuge in preference to the variety with red flowers. The respective yield of alkaloids was 3.71 and 2.43 per cent.—Drug. Circ. and Chem. Gaz., 1891, 251.

MAGNOLIACEÆ.

*Magnolia grandiflora.*—Mr. B. Alfred Randolph describes this species as having its spreading branches on the trunk at about twenty feet from the ground. Its habitat is Florida, Louisiana and Texas, although it is found as far north as Tennessee and as far west as California. It thrives best in sandy soil along the banks of rivers, and is seldom found elsewhere. It does not bear fruit until it is about five years old.

The leaves, when bruised, have a very disagreeable odor and a bitter, acrid and pungent taste, which properties are lost when the leaf becomes dry. By placing a linen cloth on the under surface of the leaf and marking with a blunt instrument, an indelible ferruginous mark is obtained. The taste of the fleshy portion of the fruit is exceedingly pungent, acrid and bitter, and when a ripe seed is bruised in the mouth the irritation often extends far back into the throat, causing a lasting disagreeable taste followed by incessant and painful coughing. The seeds, after falling from the fruit, if covered with loam, begin to grow the following spring. In raising them for ornamental purposes, out of several hundred seeds planted, only a small number ever mature. On exposure to air, the seeds become rancid, and to preserve their germinating powers they should be kept in rotten wood or moist sand.

*The bark* is about half an inch thick and breaks with a short fibrous fracture; externally, it is of a gray color and smooth, often covered with moss; inner surface whitish or after drying yellowish or pale brownish, smooth and very finely closely striate. The dry bark has scarcely any odor and a slight bitterish taste, but the fresh bark is of a strong aromatic odor and bitter acrid and astringent taste.

It is used, domestically, in infusion or decoction for the treatment of rheumatism and malaria, and the tincture made by macerating the bark in brandy or whiskey is said to have produced cures in chronic cases of chills and fever when quinine had failed.

The bark which had been collected in November, 1890, yielded an infusion of an acid reaction, and giving no precipitate on the addition of alcohol. The tincture became milky when mixed with water. By distillation with water a little volatile oil was obtained. The presence of tannin, starch, saccharine and coloring matter was shown, and on incineration 6½ per cent. of ash was left.—Am. Jour. Pharm., 1891, 437–439.

*Illicium Anisatum—Star-Anise and its Oil.*—Dr. P. Neis, a French traveller and commissioner to Tonquin, writes of the cultivation of star-anise in that region. The American Druggist, 1892, page 1, republishes with illustration an account of the methods of distillation of this oil.

*Star Anise.*—Dr. Ferdinand Oswald devotes a long paper in Archiv der Pharmacie to the chemistry of star-anise. He obtained of essential oil from the carpels 5.6 per cent., while only 2.7 per cent. was obtained from the seed; these figures being somewhat higher than those previously given by Meisener. The oil consists of a terpene, sapol, a monoethyl ether of hydrochinone and anisic acid, associated with certain aromatic bodies which are probably oxidation derivatives of veratric acid and piperonal. The seeds contain 22.3 per cent. of fixed oil, whereas the carpels yield only 1.3 per cent. The fixed oil consists mainly of olein, but it also contains cholesterin in combination with phosphoric acid.—Chem. and Drug., 1891, 139.

*Shikimic Acid.*—By J. F. Eykman. Shikimic acid is the name given to a non-poisonous acid occurring in the fruit of Illicium religiosum (Jap. Shikimi), to the extent of several per cent. Its isolation has been previously described, has also detected its presence in the fruit of the real Chinese star-anise.—O. P. and Drug. Reporter; Pharm. Era, Sept. 1891, 174.

*Liriodendron Tulipifera,* (L.).—Under the title of "The Tulip Poplar or Poplar Tree," there is an interesting and illustrated account of Liriodendron, by Dr. T. J. Rothrock.—For. Leaves, iii., 85–86.

## MALVACEÆ.

*Althæa officinalis—The Mucilage Cells of.*—By C. Hartwick (Pharm. Post, 1891, 835, 836.

*Gossypium herbaceum,* (L).—Mr. Geo. F. Atkinson of Alabama exhibited a series of colored illustrations representing the external appearance of the plant as affected by the different fungi diseases.—Bot. Sect. Am. Assoc. of Agricult. Col. and Expt. Stat., Washington, Aug. 13, 1891.

*Microscopic Examination of Cotton.*—Being a report by Dr. P. H. Mell

of a microscopic examination of about 25 different varieties of cotton grown on the State Agricultural Experiment Station. Issued by the Department of Geology and Botany of the Polytechnic Institute for the State of Alabama.—Pharm. Jour. and Trans., 1891, 30.

*Cotton-Seed Products.*—By G. Papasogli (L'Orosi, 14, 217–229).—Abstr. in Jour. Chem. Soc., 1892, 584.

*Cotton Seed—On the Nitrogenous Bases Present in.*—By W. Maxwell. A contribution from the Chemical Laboratory of the Department of Agriculture, by H. W. Wiley.—Am. Chem. Jour., 1891, 469–471.

*Hibiscus Abelmoschus—Musk Seeds.*—A description of the plant, fruit and seed. The seeds yield about 6½ per cent. of an odorous principle and resin. The seeds were formerly used in English perfumery as a substitute for animal musk, but they were never much in favor with perfumers, so they fell into disuse. In Northern India the seeds are used medicinally by the natives. The present trade in musk-seed, though a small one, is an interesting revival, and we have recently seen some seeds of good quality from the West Indies.—Chem. and Drug., 1892, 737.

### MELANTHACEÆ.

*Colchicine—Detection in Forensic Investigations.*—According to N. Obolonski, the finely divided viscera are triturated with powdered glass, treated with oxalic acid, and digested for twelve hours with alcohol. The liquid is expressed, and the extraction with alcohol repeated twice. The alcoholic liquids are concentrated at a temperature not exceeding 80° C., and the cooled residue made up to the original volume with alcohol. The filtered liquid is evaporated as before, and the process repeated until no clots separate on the addition of alcohol. The residue is dissolved in water, purified by shaking with light petroleum, and the colchicine extracted with chloroform as usual. The alkaloid is best identified by the violet color produced by nitric acid; by the coloration produced by nitrosulphuric acid (Erdmann); and by Mandelin's reagent (1 part of ammonium vanadate in 200 parts of sulphuric acid). Colchicine is with difficulty destroyed by putrefaction of animal matter.—Yearbook Pharm., 1891, 124; from Zeits. Analyt. Chem., xxix., 493.

*Colchicine—Reactions.*—For an explanation of the Roman numerals see under Chemistry.

$C_{22}H_{25}NO_6$, or written constitutionally $(CH_3O)_3C_{15}H_9(NH.C_2H_3O)$.-$COOCH_3$.

*a*. Soluble in alcohol and chloroform, but not in ether; cold water gradually dissolves it, warm water less readily. The solutions are yellow in color, of bitter taste, do not act upon litmus, and become intensely yellow when treated with mineral acids.

*b*. A simple method of obtaining a solution of colchicine is to heat 5 gms. of colchicum seed for an hour with 15 c.c. of alcohol; filter and

evaporate the filtrate to about ½ c.c., then dilute with 4½ c.c. of water, and filter after the solution has become clear.

*c.* Reagent VII. produces in solutions of colchicine little or no precipitate or turbidity unless a mineral acid be added, when a copious amorphous yellow precipitate is formed.

*d.* Fehling's solution after standing several hours with colchicine solutions is reduced and red cuprous oxide ($Cu_2O$) is deposited. This reaction is due to the sugar in the colchicum seed.

*e.* Evaporate about 1 c.c. of the colchicine solution to dryness on a water-bath, so that there is formed a crust of the colchicine all over the dish. To an alcoholic solution of part of it add a few drops of a highly dilute solution of reagent XXI.—a brownish green color is produced. Reagent XIII. when treated with some of the colchicine becomes intensely yellow, and develops violet streaks when touched by a glass rod moistened with reagent XV. The violet color soon changes to brown, and is produced also by reagent XV. acting on the alkaloid alone.

*f.* Treat some colchicine with a few drops of reagent XV., and then add some alcohol; a light brown colored liquid results, which when dropped into reagent I. becomes beautifully red. Neither ether nor chloroform takes up this coloring matter, and it fades rapidly if heated on a water-bath.

*g.* The above reactions can also be carried out with the residue obtained from the evaporation of wine of colchicum, but they will not be as marked or as decided as in the case of colchicine solutions obtained according to the plan given under *b.*—Pharm. Review, 1892, 27.

### MELIACEÆ.

*Epicharis* (*Dysoxylon*) *Loureirii*, Pierre, and *E. Baillonii*, Pierre.—Natives of Yunnan and Cochin China, are stated to be sources of sandalwood. —Chem. Drug., Aug. 1891, 220.

*Guarea grandiflora.*—Musk-Wood, obtained from South America.—Bull. of Pharm., 1891, 508.

*Melia Azadirachta or China Tree.*—By Mr. J. C. Kiernander (Aust. Jour. of Pharm.). The author describes the tree and its properties.—National Drug., April 1892, 112.

*Swietenia humilis Zucc.*—By Dr. H. Solereder (Archiv Pharm., 249). The author reports upon the seeds of this plant, which are used in Mexico as a quack medicine.—Pharm. Post, 1891, 606, 607.

### MENISPERMACEÆ.

*Calumba Root - Constituents.*—Bocchiola analyzed the cortical and woody portions of calumba root as follows:

| | Outer part. | Inner part. |
|---|---|---|
| Water | 13.00 | 14.00 |
| Ash | 5.00 | 6.00 |
| Ether extract | 0.70 | 0.80 |
| Alcohol extract | 3.89 | 3.86 |
| Proof spirit extract | 17.96 | 17.80 |
| Calumbine | 1.42 | 1.90 |
| " by titration | 0.98 | 1.38 |
| Berberine | 1.43 | 0.72 |
| " by titration | 2.95 | 1.45 |
| Percentage composition of ash:— | | |
| Silicic ash | 14.13 | 7.42 |
| Phosphoric acid as an iron salt | 6.11 | 1.61 |
| " combined with alkaline and earthy bases | 5.04 | 12.63 |

The older root contains more of the active principles than the younger root.—Yearbook Pharm., 1891, 162, from Chem. Drug., 1891.

*Spurious Pareira Brava from Bahia—Microscopical Characters of.*—This drug entered commerce about the end of the year 1890. As examined by Mr. W. Murton Holmes, it consisted of pieces of both stems and root.

"In the stem of true pareira there is a considerable amount of parenchyma outside this layer, composed of cells elongated in a tangential direction, and this also obtains with the cells in the middle of the large medullary rays; whereas in the spurious variety now under investigation the woody bundles of each successive zone begin almost close up to the sclerenchymatous layer." This he considers may be a distinguishing mark of some value.

*Root.*—A longitudinal and tangential section of the roots, both of the true and spurious pareira, shows that the woody bundles are arranged in an open network. Dotted and reticulated vessels, with lateral prolongations similar to those in the stem, are abundant in both kinds, and are especially evident when the sections are not perfectly exhausted of air. In a transverse section the cavities of the pitted vessels in the woody bundles of the root of chondodendron are seen to be not more than half the diameter of those in the stem. This is an important character. Starch is much more abundant in the root of true pareira than in the stem. All the parenchymatous tissue, even that considerably thickened by secondary deposits, is full of it. The granules are mostly compound, but not of large size. Crystals, apparently octahedral, are also present. The root has much the same general structure as the stems, as far as the distribution of the woody bundles is concerned.

On comparing a section of the root of the spurious pareira with a section of the root of chondodendron, I find the following differences:

1. The vessels in the woody bundles of the spurious are about twice the diameter of those in true pareira.

2. The sclerenchymatous tissue outside each zone is more conspicuous.

3. The bases of the woody wedges are concave. In true pareira they are nearly straight.

4. The mass of parenchyma at the base of the wedges is in consequence nearly circular.

5. The spurious pareira contains only a few scattered grains of starch.

6. The medullary rays are narrow in the spurious variety, and the cells are elongated in a radial direction. In true pareira they are broad, and the central cells elongated transversely. They are also loaded with starch granules.

7. The zones of the spurious are more regular in size, and the number of woody wedges is greater. The point from which the wedges radiate is very eccentric.

The paper is illustrated.—Pharm. Jour. and Trans., 1892, 829–831; Am. Jour. Pharm., 1892, 250–255.

*Pareira—True and Commercial.*—In a paper on "The Relation of Geography and Materia Medica," Mr. E. M. Holmes draws attention to a spurious variety of Pareira Brava from Bahia, which, at his request, was examined microscopically by W. Murton Holmes, and chemically by F. A. Ringer and E. Brooke. The following table will show the result of their analyses so far as they have conducted them:

| | Per cent. from True. | Per cent. from False. |
|---|---|---|
| Moisture (110° C.) | 9.30 | 8.99 |
| Ash (containing Fe, Al, Ca, Na, and K, also phosphates, sulphates, and silicates) | 4.29 | 1.32 |
| Fats and fatty acids (petroleum ether extract) | 8.67 | 0.28 |
| Acid Resin (ether extract) | none | 0.24 |
| Alkaloid, } Extracted by absolute alcohol. | 0.819 | 0.143 |
| Tannin, etc., } Extracted by absolute alcohol. | 1.261 | 2.497 |
| Phlobaphene, } Extracted by absolute alcohol. | 0.52 | 0.53 |
| Mucilaginous and albuminous substances (extracted by water | 11.76 | 6.05 |
| Substances extracted by soda (0.1 per cent., solution), | none | none |
| Starch, lignin, cellulose, and non-extractive matter (by difference) | 63.38 | 79.95 |
| | 100.00 | 100.00 |

They think from these results the conclusion may safely be drawn that the root of chondodendron is much richer in chemical and extractive principles than the substitute.

The root of chondodendron gave 13.67 per cent., and that of the substitute 9.73 per cent. of extract. These extracts were made with boiling water, as directed in the Pharmacopœia, and were thoroughly dried at a temperature of 110° C. These figures show that the true root affords a much larger yield of extract than the substitute.

They extracted the alkaloid by another method. From the true root it was at first of a white color, but on drying changed to a light yellow. It was amorphous, and did not readily melt at 145° C., although a change occurred at that temperature. When heated strongly in a dry test tube it melted, charred, and swelled up, giving off a strong, peculiar odor, which somewhat resembled that obtained from beberine.

The alkaloid from the false was of a somewhat darker color than that from the true, and on drying still further darkened. The melting-point of this was not taken, on account of the small quantity obtained for experiment. It also was amorphous.

Both alkaloids were insoluble in water, but freely soluble in absolute alcohol and ether.

The following experiments were made on both alkaloids:

COLOR REACTIONS.

| False. | Reagent. | True. |
|---|---|---|
| Dirty green, changing slowly to brown, finally to slate color. | Fröhde's. | Brownish green, changing to light brown. |
| Red-brown, remaining so. | Nitric acid. | Vandyke or black-brown, becoming lighter. |
| Slight green tint, then deep brown. | Sulphuric acid. | Light brown. |

The alkaloids were then converted into the hydrochlorides, and eventually with great difficulty were obtained in a partially crystalline form by slow evaporation from alcohol. Both salts were similar, the crystals being needle-shaped and very small. Both drugs probably contain the same alkaloid, and require further investigation.

In conclusion, the chemical difference between the two roots may be summed up as follows:

The substitute contains much less ash, less mucilage, less alkaloid, a much smaller proportion of fats and fatty acids, a small quantity of an acid resin, no starch, and affords a much smaller quantity of extractive matter.—Pharm. Jour. and Trans., 1892, 703, 704; Am. Jour. Pharm., 1892, 255-260.

## MYOPORINEÆ.

*Eremophila Mitchelli*, Bth., a small tree, found in Queensland and Australia, the wood of which is very hard, of a brown color, beautifully marked, and very fragrant, resembling that of sandal-wood.—Chem. Drug., Aug. 1891, 220.

*Myoporum platycarpum*, R. Br., an Australian tree, known under the name of sandal-wood. Being fine-grained and beautifully mottled, it is well fitted for cabinet work.—Chem. Drug., Aug. 1891, 220.

## MUSCI.

*Moss—Pharmaceutical Uses.*—S. A. Walton calls attention to the various preparations of moss, some of which, no doubt, will prove of use to pharmacists. The moss is first gathered, dried at a low temperature, and compressed into sheets of various sizes, and in this form known as "moss paste-board" ("moss pappe"). A second variety is "moss felt," in which the moss is not so closely compressed, and in which form it is better adapted for bandages and pads. A third variety is "moss siftings," being small, dried moss in a loose condition. The paste-board is well adapted for rough-drying precipitates.—Pharm. Journ. Trans., Feb. 1892, 643.

## MYRICACEÆ.

*Myrica asplenifolia*, Blum.—Joseph H. Fenn examined this plant, collected near Philadelphia in October. The aromatic properties were found to reside in the resin, which, however, did not lose anything corresponding to a volatile oil at 110° C., nor was it found to contain any volatile aromatic acid. The drug yielded 4.35 per cent. of tannin, which yielded gallic acid. The plant collected in January yielded 3.68 per cent. of tannin.—Am. Jour. Pharm., 1892, 121.

*Myrica asplenifolia.*—By Josiah C. Peacock. (Am. Jour. Pharm., 1892, 303–305.) The author analyzed the rhizome, and found a fat, two waxy substances, and an extract possessing a narcotic odor. When the extract was dissolved in absolute alcohol and that solution allowed to evaporate spontaneously, there separated a resinous varnish-like substance on the side of the beaker, while on the bottom of the vessel a yellow granular powder was obtained. Tannin, glucose, saccharose, mucilage, albuminoids, starch and phlobaphenes were also present.

*Tannin in the Fresh Rhizome.*—Two lots of the rhizome were collected, one in January and the other in June, 1891. Both were estimated in the moist condition. Twenty grams were used in each case to make a litre of decoction. Both of these decoctions were yellow in color when viewed in bulk, turbid, and had but slight odor and reaction and a weakly astringent taste. Both gave blue precipitates with ferric salts. The decoction made from the lot collected in January, after standing for two days, gave a green precipitate with ferric chloride, with which, when fresh, it had given a blue one.

The tannin was estimated gravimetrically, using gelatin and alum solution to precipitate it. The precipitates in both cases were flesh-colored. The filtrate from the precipitate of the January lot was clear and colorless, and from the June supply clear and light yellow.

The following summary of the estimations gives the amount of tannin in the "moist" state, and, after allowing for the moisture present, which is also stated in the table, the amount present in the "absolutely dry"

rhizome. The percentages of tannin stated under the head of "moist" are the averages of two or three closely agreeing results.

| 1891. | Tannin in Moist Rhizome. | Moisture. | Tannin in Absolutely Dry Rhizome. |
|---|---|---|---|
| January | 2.43 | 35.50 | 3.77 |
| June | 3.43 | 49.55 | 6.79 |

*Gallic Acid.*—A trace of this substance was found in the January sample; that collected in June showed no evidence of it.

MYRISTICACEÆ.

*Powdered Mace* is often mixed with considerable quantities of Bombay mace (see Am. Jour. Pharm., 1890, 398; 1891, 188); the addition of powdered or ground nutmeg can be determined by the presence of starch in such mace.—P. Soltsien, Pharm. Ztg., 1891, 600; Am. Jour. Pharm. Nov. 1891, 539.

*Nutmeg Cultivation in Jamaica.*—In the Bulletin of the Botanical Department of Jamaica for October, 1891, it is stated that a large stock of the very first nutmegs for seed has been imported to Jamaica from Grenada, and has been sown in the Hope Gardens, and, when ready for distribution will be sold at the very low rate of three half-pence each, in large or small quantities. It is hoped that these arrangements will tend to develop the planting of nutmegs on a larger scale in suitable districts in Jamaica. A description of the germination of the seed and the character of the soil, etc., necessary for a successful crop is given, in connection with which is a note on the curing of nutmegs in Grenada. Regarding the value of the produce of nutmeg trees when in full bearing, it is stated that one grower in 1883 realized from two trees as much as £30.—Jour. of the Soc. of Arts; Pharm. Jour. and Trans., 1892, 656.

*Myristicin.*—This constituent of mace oil forms white crystals melting at 30.25°, and is shown by F. W. Semmler (Berichte, xxiv., 3818), to be the butenyl-dioxymet-hylene-methoxyl derivative of benzene ($C_{12}H_{14}O_3$).—Pharm. Jour. and Trans., 1892, 815.

*Adulteration of Powdered Mace with False or Bombay Mace—Detection.*—The methods by Böhm are given.—Bull. of Pharm., 1891, 509.

*Mace - False.* - According to examinations made in Bremen, the chief difference between genuine and false mace appears to be the percentage of alcoholic extract; the genuine yielding from 39 to 44 per cent., while the false yields from 60 to 65 per cent.—Chem. Zeitg. (Rep.), 1891, 241.

MYRTACEÆ.

*Eucalyptus.*—A useful contribution to the natural history of the Eucalypti is given by A. W. Howitt (Trans. Royal Soc. Victoria, vol. II., pt. 1),

who enumerates nearly 50 species natives of Gippsland.—Phar. Jour. and Trans., 1892, 814, 815.

*Eucalyptus Globulus, Labillardière.*—Sig. G. Briosi has undertaken an exhaustive investigation of the anatomical structure of the leaves of E. globulus, (Ricerche intorno all' anatomia delle foglie dell' Eucalyptus globulus', 23 pl., Milano).—Pharm. Jour. and Trans., 1892, 815.

*Eucalyptus cneorifolia, D. C.*—Oil is being prepared from this species of Eucalyptus at Kangaroo Island, South Australia (Notes on Australian Economic Botany, 136).—Pharm. Jour. and Trans., 1892, 815.

*Oleum Eucalypti of Commerce.*—A note calling attention to the somewhat unsatisfactory state of our knowledge of the eucalyptus oils of commerce, by E. M. Holmes.—Pharm. Jour. and Trans., 1892, 877.

*Eucalyptus Oils—Notes On.*—By J. H. Maiden, Curator of the Technological Museum of New South Wales. He classifies the oils yielded by the different species of Eucalyptus into three groups: 1. Scented or Perfume Oils; 2. Mallee Oils; 3. Other Eucalyptus Oils.—Bulletin of Pharm., 1891, 461–464.

*The Eucalyptus in California.*—An account of the history and growth of Eucalyptus in California. - Chem. and Drug., 1892, 145.

*Eucalyptus oleosa—The Nature of the Oil of.*—The writer concludes that this oil is far superior in its medicinal activity to the oil prepared from E. amygdalina.—Pharm. Era, Nov. 1891, 274, 275.

*Oil of Eucalyptus.*—The oil of Eucalyptus maculata, var. citriodora is stated to be a good antiseptic. It is a faintly yellowish liquid with a strong, melissa-like odor, in which Schimmel & Co. discovered an aldehyde (also found in citronella oil by Dodge) $C_{10}H_{18}O$, and which they name "citronellon;" eucalyptol, however, was not found in it. Thoms found that the greater part of it passes over at 200° to 205° C., the thermometer remaining stationary for some time at 200° C., which is the boiling point for pure citronella oil.—Pharm. Jour. and Trans., Aug. 1891, 165; from Ph. Centralhalle, 1891, 469.

*Oil of Eucalyptus—Examination.*—R. H. Davies and T. H. Pearmain have examined 24 samples of oil (from Eucalyptus amygdalina, E. Baileyana, E. dealbata, E. dumosa, E. globulus, E. odorata, E. oleosa) with the following average results:

| | Sp. gr. | Sp. rotat. $(a)_D$. | Solution of salicylic ac. | Phellandr'n reaction. | Solution in alcohol. | Acidity as acetic acid. | Iodine absorption. |
|---|---|---|---|---|---|---|---|
| Average. | .9015 | —12.15 | 1 : 7.6 | Present in 6 samples. | .......... | .09 | 139.61 |
| Highest. | .927 | +18.09 | 1 : 17.6 | .......... | 5 : 50+ | .23 | 192.89 |
| Lowest. | .8575 | —64.72 | 1 : 3 | .......... | 5 : 1 | .02 | 41.10 |

The authors confirm the conclusion drawn by MacEwan and others as to the two well-marked varieties of eucalyptus oil. The first kind of oil has a specific gravity of .900 to .930, has but little rotation, remains liquid when subjected to the action of nitrous acid, showing absence of phellandren; whilst the second has a gravity of .885 or lower, a strong rotation to the left, and yields a solid mass when treated with nitrous acid, owing to the phellandren it contains. The only commercial oil which contains phellandren is that derived from E. amygdalina. Since pure eucalyptol is optically nearly inactive, an oil with a high rotatory power will be found to contain but little eucalyptol.—Pharm. Jour. and Trans., Sept. 1891, 235–238.

*Oil of Eucalyptus.*- W. Lloyd Williams got hold of an oil of eucalyptus which did not deviate the polarized ray in a 200 mm. tube. Upon fractionation the fractions were found to possess the following rotatory powers:

| No. of Fraction. | Boil. Point. | C.c. Collected. | Observed rotation D ray, in 200 mm. tube. |
|---|---|---|---|
| 1 .............. | Below 170° C. | 12 | +12° |
| 2 .............. | 170°–172° C. | 21 | +6° |
| 3 .............. | 172°–174° C. | 29 | (Lost.) |
| 4 .............. | 174°–179° C. | 55 | ±0° |
| 5 .............. | 179°–182° C. | 12 | —6° |
| 6 .............. | 182°–184° C. | 9 | —10° |
| 7 .............. | Residue. | 12 | Not determined. |

Eucalyptol itself is inactive. The apparent inability of the oil in question to deviate the ray is a consequence of the union of oppositely-rotating constituents. The specific gravity of the oil at 65° F. (18.3° C.) was 0.925, and the rotations were taken at the same temperature. There is no reason to suppose that the oil had been tampered with; the odor was good, and fraction 4 solidified completely when placed in a mixture of ice and salt.—Chem. Drug., March 1892, 412.

*Terpin Hydrate.*—E. Merck has prepared terpin hydrate from oil of eucalyptus in the same way in which it is prepared from oil of turpentine, by the action of nitric acid and alcohol. The constituent of oil of eucalyptus to which it owes its origin is pinene.—Am. Drug., 1892, 70.

*Oil of Cloves.*—The value of this oil depending upon the quantity of eugenol present, H. Thoms proposes the following method of assay depending upon the formation of benzoyl-eugenol (see Am. Jour. Pharm., 1891, 406): 5 gm. of the oil, 20 gm. solution of sodium hydrate (15 per cent.) and 6 gm. benzoyl chloride, are placed in a tared beaker of 150 c.c. capacity and thoroughly mixed, this causing the mixture to become quite hot; after cooling, 50 c.c. water are added, and heat applied

until the crystalline mass melts, and again allow to become cold; the clear liquid is run through a weighed filter (dried at 101° C.), and the same operation of washing the crystals repeated twice with 50 c.c. water. To remove the sesqui-terpene, which may contaminate the benzoyl-eugenol, the crystals have to be washed with alcohol; this is effected by adding to the still moist crystalline mass in the beaker 25 c.c. alcohol of 90 per cent., warming until solution is effected, rotating the solution until the crystals begin to separate again, then allowing the contents of the beaker to cool to 17° C., transferring to the weighed filter and washing with a little 90 per cent. alcohol until the filtrate measures 25 c.c.; the filter with contents is then at once transferred to the beaker, dried at 101° C. and weighed. To the weight of the benzoyl-eugenol must be added 0.550 gm., the amount soluble in 25 c.c. 90 per cent. alcohol; this weight, multiplied by 164 (the molecular weight of eugenol) and divided by 268 (the molecular weight of benzoyl-eugenol) gives the amount of eugenol in 5 gm. oil; for the percentage multiply again by twenty.

An examination of sixteen samples showed the eugenol to vary from 76.87 per cent. to 90.64 per cent.; the oil distilled from the stems was found (contrary to expectations) to contain a high percentage of eugenol, 83–85 per cent.; the specific gravity of the oil was not found to agree with the percentage of eugenol, as the following show: 1.059=83.2 per cent.; 1.065=80.89 per cent.; 1.065=82.77 per cent.; 1.0615=84.10 per cent.; 1.0655=90.64 per cent.; 1.061=81.18; this led to the belief that there must be a third constituent present in the oil, for if there were only eugenol and sesquiterpene, the specific gravity should vary in accordance with the percentage of eugenol.—Pharm. Centralhalle, 1891, 589; Am. Jour. Pharm., 1892, 26, 27.

*Zanzibar and the Clove Trade.*—Chem. and Drug., 1892, 421, 422.

*Cinnamyl-eugenol* $C_{10}H_{11}O.OC_9H_7O$ forms colorless, odorless, tasteless, lustrous needles, melting at 90–91° C., neutral in reaction; solubility and color reaction like the preceding. Both are easily saponified and then on addition of acid give the characteristic eugenol odor and separate the acid. J. D. Riedel of Berlin has applied for patents covering the manufacture of these compounds directly from the oil of cloves; they are to be used in pulmonary affections, acting in the same manner as benzosol and styracol (Am. Jour. Pharm., 1890, 444 and 1891, 188).—Dr. H. Thoms, Pharm. Centralhalle, 1891, 365; Am. Jour. Pharm., Aug. 1891, 406, 407.

*Oil of Cloves.*—Instead of adopting the assay process of Thoms (estimation of eugenol), Schimmel & Co. think that it would be more rational for the pharmacopœias to replace the oil of cloves with eugenol, which can be obtained without much difficulty, and can easily be tested for purity. Thoms' process, excellent as it is, is too cumbersome and time-consuming.—Pharm. Zeitg., 1892, 225.

*Essence of Myrtle.*—By P. Bartolotti (Gazzetta, 21, 276–282). The essence of myrtle, when purified by redistillation over calcium chloride, is a colorless, mobile liquid, soluble in alcohol, ether, étc., but only sparingly in water; the aqueous solution has the strong characteristic odor of the essence. The sp. gr. of the essence is 0.881 at 27°. By continued distillation it may be split into four fractions.—Jour. Chem. Soc., 1891, 1384.

*Myrtol.*—Myrtol is that portion of the oil of Myrtus communis distilling between 160° and 170° C. It contains cineol identical with cajeputol and eucalyptol and a hydrocarbon $C_{10}H_{16}$. It is used with some success in putrid bronchitis and pulmonary gangrene. It is partially eliminated by the respiratory way, diminishing the odor and at the same time the quantity of the expectorations. As it is also partially eliminated by the kidneys, it was proposed for the treatment of catarrhal affections of the urinary tract. It is used in capsules containing 15–20 cgm., eight or ten being given during a day, when the patient is without fever. In the treatment of affections of the respiratory tract it may be used hypodermically. The solution used is 1 part of myrtol to 4 parts of liquid paraffin or oil of sweet almonds. Two injections of 3–5 gm. of the solntion are given a day.—Am. Jour. Pharm., 1892, 315, 316.

*Eugenia (Syzygium) Jambolana—Use and Value of in Diabetes.*—(Notes on New Remedies, Jan., 1892, 92–94.)

*Jambul Bark.*—N. Wender has examined the bark of Eugenia Jambolana, of which tree the fruit and seeds have been the subject of numerous researches. The bark occurs in large, hard pieces up to 1 cm. thick, and covered externally with reddish and gray braids or scales, which are easily rubbed off. The bark, freed from these scales, possesses a reddish-yellow exterior. Internally the bark is dark-brown, and shows longitudinal fibres. The fracture is fibrous; the taste astringent. A cross-section of the bark permits the distinguishing of two differently-colored layers, of which the outer one is bright brown, nearly two mm. broad, with deep fissures and rough, lumpy upper surface. It also shows numerous concentric slight, dark lines. The inner part of the bark is pink to chocolate-brown, with smooth longitudinal fibres, and is two to three times as broad as the outer part. In the brown ground mass of the inner cross-section of the bark numerous white spots and points may be seen in almost concentric arrangement, imparting to this portion of the bark a marble-like appearance. The rather large spots, which may be seen even with the naked eye, are characteristic of the genus.—Yearbook Pharm., 1891, 168, from Chem. Drug., 1891.

*Oil of Bay (Laurus nobilis).*—This oil has a pale straw-yellow color, a specific gravity of 0.9315, solidifies at 12° C., and possesses a peculiar odor, reminding of cinnamon and Japanese camphor oil. On addition of

sulphuric acid it is colored dark orange-red, and the cinnamon odor becomes more pronounced.—Chem. Drug., 1892, 42.

NYMPHÆACEÆ.

*Nelumbo nucifera*, Gaertner — (*Nelumbium speciosum*, Willd.).—The author enters into the history, habitat and properties of the plant. The microscopical illustrations of the fruit, seed, cotyledons, starch grains and fibro-vascular tissue of the stem are very fine.—Chem. Zeitung, 1892, 44, 45.

OLEACEÆ.

*Fraxin and Fraxetin.*—By G. Koerner and P. Bigiwelli (Gazzetta, 21, ii., 452–454). The authors confirm observations on the properties of fraxetin. It melts at 227°, and is found by Zeisel's method to contain one methoxy-group.—Jour. Chem. Soc., 1892, 628.

*Manna—Purified.*—Dissolve in water, filter, and evaporate to the former weight.—Pharm. Zeitg., 1892, 390.

*Mannit.*—W. Kwasnik questions the accuracy of the statement found in most text-books, that mannit does not reduce Fehling's solution (that is, an alkaline copper solution). He finds that mannit, boiled for a short time with Fehling's solution, or even on standing for some time with the hot solution, occasions a not inconsiderable precipitate of cuprous oxide. Theoretically mannit will not act on the copper solution, but it is altered more or less on being boiled with an alkali, when it will commence to act. That mannit is altered by alkali is evident from its optical behavior; mannit is optically inactive, but on boiling with boric acid or an alkali it will become, in the first case, dextrogyre, and in the last case laevogyre.—Chem. Zeitg., 1892, 110.

*Sodium Mannite.*—By de Forcrand (Compt. rend., 114, 226–228). Berichte, 1892, 25, 198.

*Olive Oil—Adulteration.*—A. B. Stewart tells his experience with a guaranteed "pure" olive oil, which proved to be a mixture of lard oil with a variable proportion of cotton-seed oil and minute traces of poppy oil.—Am. Jour. Pharm., Aug. 1891, 395.

*Olive Oil—Reactions.*—After an exhaustive examination of a large number of samples, G. de Negri and G. Fabris find that the iodine number is slightly higher for oils derived from mature than from immature olives, whilst the reverse is the case with regard to the age of the oil; also, the mode of manufacture has an influence on this test, the number at times rising as high as 88. The specific gravity is almost constant, varying from 0.916 to 0.918 at 15° C. The free fatty acids of the oil, obtained by pressure, melt at 24° to 27° C., and solidify at 17° to 22° C.: those obtained by extraction with carbon bisulphide or ether melt at 25° to 29° C., and solidify at 22° C. The saturation equivalent varies from 185 to 196,

and is 190 for most samples. The temperature of a mixture of the oil and sulphuric acid was nearly constant at 35° C., the lowest reading being 32°, the highest 37° C.—Journ. Chem. Soc., 1891, 1559; from Chem. Centralbl., 1891, ii., 87.

*Olive Oil—Purity.*—An adverse opinion of B. F. Davenport about an invoice of olive oil induced G. Fabris to thoroughly examine all the recognized tests as to their reliability, the result of which investigation has been embodied in a pamphlet by S. Canizzaro and G. Fabris, from which the following somewhat extended notes are taken:

The experiments were made upon olive oil of most undoubted genuineness, nearly all having been made in the presence of Fabris himself, besides several samples of seed oils.

1. *The Sulphuric Acid Test.*—The directions of the U. S. Ph. to drop the oil upon the acid are the reverse of those given by the originator, Heydenreich, in 1841, to drop the acid upon the oil. Fabris found that if the proportion of oil was increased, a greenish tint was produced, which also appears when the acid is dropped upon the oil, and when the acid contains a little nitrous acid. He found, further, that some of his oils turned more or less orange or reddish-brown, and considers therefore this test as of no value whatever, except as a *negative* test.

2. *Subacetate of Lead Test.*—Fabris put into a test-tube, 16 c.c. long and with an external diameter of 18 mm., 10 c.c. of oil and 10 c.c. of subacetate of lead solution. After shaking the tube for about two minutes and allowing it to rest, the color indication and the appearance of the contents were observed, both immediately and after twelve hours. He found this test untrustworthy, since some samples of genuine cotton-seed oil failed to give any color reaction. The same is to be said of R. Meade Smith's modification of this test: Shake 10 c.c. of oil and 10 c.c. of ether in a test-tube, add 5 c.c. of a strong solution of neutral acetate of lead and then 5 c.c. of ammonia, and shake again. An orange-red color will be observed, especially in the upper layer, in the presence of cotton-seed oil.

3. *Hauchecorne's Test.*—Into a test-tube place 6 gm. of the oil and 2 gm. of a mixture of 3 parts of chemically pure nitric acid and 1 of water. Shake for about two minutes, and notice the color of the mixture; next place the tube in boiling water, leaving it there for not more than fifteen or twenty minutes, and again observe the color. Pure olive oil either loses its color or becomes of a pale-green; after heating, it either resumes its natural color or becomes paler, but in no instance does it turn orange. Seed oils before heating either lose the color or turn reddish; after heating they rapidly change to reddish-brown or orange-red. This test appears to be reliable, judging from the behavior of genuine olive oil, which, according to the first two tests, would have been condemned.

4. *Brullé's Test.*—10 c.c. of the oil are heated without shaking with

1 gm. of dry and finely powdered albumen, and 2 c.c. of the above-named nitric acid. When the acid begins to boil, incline the tube and shake cautiously, continuing the heat until the albumen is seen to dissolve. The color of pure oil will be but little changed, while seed oils will vary from orange yellow to brown.

5. *Bechi's Test.*—Although well known, it is given here as it has been modified in the details.

| | |
|---|---|
| Solution I. | |
| Argentic nitrate | 1 gm. |
| Alcohol (98 p. c.) | 200 c.c. |
| Ether | 40 c.c. |
| Nitric acid (sp. gr.?) | 0.1 gm. |
| Solution II. | |
| Amylic alcohol | 100 c.c. |
| Colza oil | 15 c.c. |

Ten c.c. of the oil, 1 c.c. of the silver solution I, and 10 c.c. of solution II are placed in a test-tube, and well agitated. Half of this mixture is kept as a standard for comparison. The first tube is then heated in a bath of boiling water for a quarter of an hour, and then the color is compared with that of the standard. The pure olive oil does not take a brown color; but seed oils rapidly change to a red-brown.

Both the alcohol and ether must be pure; the colza oil must have been filtered two or three times through paper in a boiling water-funnel; and finally 10 c.c. of solution II, heated for a quarter of an hour in a boiling water-bath with 1 c.c. of solution I, should retain the original color. The oil to be tested should be treated as the colza oil. Fabris states that this test always gives negative results with pure olive oil. (The editor of Am. Drug. states that when cotton-seed oil has been heated previously to the test, it retains its natural color.)

6. *Milliau's Test.*—Twenty gm. of the oil are heated with 30 c.c. of an alcoholic solution of potassa (20 p. c. in 70 p. c. alcohol) until saponified. After continuing the heating for 15 minutes longer, about 250 c.c. of cold water are added, and the soap decomposed by a slight excess of dilute sulphuric acid. About 10 gm. of the fatty acids are dissolved in alcohol (90 p. c.) in a test tube next 2 c.c. of silver solution (3 gm. in 100 of 90 p. c. alcohol) are added, and the mixture heated for 15 minutes on a water-bath (90° C.). With pure olive oil neither the solution nor the precipitate exhibits any color, but cotton-seed oil turns more or less brown. The alcohol must be pure. Fabris found this test always to give negative results with pure olive oil.

7. *Schneider's Test.*—This test is stated to be specific for oils of the cruciferæ. Shake 5 gm. of the oil with 10 c.c. of ether, add 20 drops of a saturated alcoholic solution of argentic nitrate, and shake; then set it

aside in a dark place. After some time either a brown color or a precipitate is observable in the presence of cruciferous oils, but not with pure olive oil.

8. *Baudoin's Test.*—This is a test for oil of sesamum. Dissolve 1 gm. of powdered sugar in 100 c.c. of hydrochloric acid (1.18). To 1 vol. of this solution add 2 vols. of the oil, and shake well. After being allowed to stand for a few minutes the contents will separate into two layers, the lower aqueous one of which will be colored crimson-red.

9. *Renard's Test.*—Specific for oil of arachis (peanut). Ten gm. of the oil are saponified with alcoholic solution of potassa, decomposing the soap with hydrochloric acid, dissolving the fatty acids in 50 c.c. of 90 per cent. alcohol, precipitating with subacetate of lead, washing the precipitate, and then extracting the oleate of lead with ether. The residue is decomposed by hydrochloric acid, and the fatty acid dissolved in 50 c.c. of 90 per cent. alcohol, when the arachic acid will crystallize out in iridescent scales.

10. *Huebl's Iodine Number.*—For the necessary solutions and their application, see under Fats, iodine number. The iodine number varies somewhat, but if an oil has a number between 80 and 87 and complies with the other tests, it may be regarded as genuine.

11. *The iodine number of the free fatty acids* is a trifle higher than that of the oil itself, being about 81 to 84.

12. *The Saponification Number.*—This represents the quantity of potassa in milligrams required to saponify 1 gm. of oil. Heat 2 to 3 gm. of the oil on a water-bath with 25 c.c. of an alcoholic solution of potassa (3 gm. in the litre) until complete saponification takes place, and then titrate the excess of potassa with semi-normal hydrochloric acid, using phenolphthalein as indicator. Another portion of 25 c.c. of the potassa solution is also titrated, and the difference between the two titrations shows the amount of potassa which has entered into combination.

The saponification number of olive oil varies between 186 and 190, and is usually about 190. As compared with cotton-seed oil, this test is useless, as the difference is very slight.

13. *Maumené's Test.*—When 15 c.c. of olive oil and 5 c.c. of sulphuric acid of 66° B. (1.840) are mixed together at a temperature of 20° C., the temperature will rise to 32°–37° C., generally between 33° and 35° C.

14. *The Specific Gravity.*—This is very uniform, between 0.916 and 0.917; that of cotton-seed oil being, for recent oil 0.9245; old winter oil 0.9235; old summer oil 0.9250.

In justice to the importers, the oil must be shown either to comply or to fail to comply with a number of tests of acknowledged reliability. A single or a few tests give no reliable criterion of purity or otherwise.—Am. Drug., 1891, 360–362.

*Olive Oil—Tests for Purity.*—F. Lengfeld and L. Paparelli have had access to eleven samples of California olive oil of undoubted purity, and took occasion to compare these oils with several commercial salad oils, including cotton-seed oil and mustard seed oil. They found that the iodine number for pure olive oil varied from 77.28 to 88.68; the elevation of temperature, in contact with sulphuric acid of 66° B., varied from 33.5° to 41° C.; the oil with the highest iodine number gave also the highest temperature. As to the fatty acids, they consider the determination of less importance, because the differences are too small. The melting point was below 28°; of the color reactions they consider Becchi's as especially characteristic for cotton-seed oil.

*Union salad oil* was found to have iodine number 105.30; elevation of temperature 72° C.; fatty acids 96.66 per cent.; melting point of fatty acids, 35° to 36° C.; reactions with Becchi's, Hauchecorne's and Brulle's tests.

*Cotton-seed oil.* Iodine number, 107.00; temperature, 79° C.; fatty acids, 96.17; melting point, 37° to 38° C.; reactions with all three tests.

*Mustard-seed oil.* Iodine number, white 97.68, black 103.07; temperature, white 49.5°, black 58.5°; fatty acids of both, 96.70 per cent.; melting point of both, 34° to 36° C.; no reaction with Becchi, but with both Hauchecorne and Brulle.—Chem. Zeitg. (Rep.), 1892, 132; from Rev. Internat. Falsificat., 1892, 98.

*Testing Olive Oil.*—E. Dieterich.—Helfenberger Annalen, 1890, 79; Jour. Soc. of Chem. Indus., 1891, 800.

*Olive Oils and Seed Oils—Test for.*—By R. Brule. (Compt. rend., abs. in Am. Drug.) The author applies a nitrate of silver test.—Pharm. Era, Sept. 1891, 142.

*Olive Oil Adulteration and How to Detect the Adulterants.*—By Prof. L. Paparelli. (Jour. Analyt. Chem.)—Pharm. Era, April 1892, 197, 198.

*Olive Oil - Detection of Arachis Oil.*—Holde finds that the best test is the separation of arachic acid according to Renard. According to the quantity of arachis oil present, 10 to 40 gm. of the oil is saponified, the fatty acids separated by hydrochloric acid, dissolved in 90 per cent. alcohol, and precipitated with acetate of lead. The oleate of lead is extracted with ether, and the residue of palmitrate and arachate of lead decomposed by hydrochloric acid. The fatty acids are dissolved in 50 to 200 c.c of hot 90 per cent. alcohol, and the arachic acid, which separates on cooling, washed with 90 per cent., then with 70 per cent. cold alcohol, dissolved in hot alcohol, and the alcohol evaporated. The melting point must be 70°–71° C.—Chem. Zeitg. (Rep.), 1891, 228, from Mittheil. Techn. Vers.-Anst., 1891, 105; Drug. Circ., 1891, 249; Pharm. Record, 1892, 112.

*Olive Oil—Detection of Cottonseed Oil.*—Labiche has published a test

for the presence of cottonseed oil in lard, which consists in shaking 25 c.c. of melted lard with 25 c.c. of solution of acetate of lead (1 : 2) and adding 5 c.c. of ammonia, when a more or less pronounced orange-red color will appear. Dieterich has tried this test, and found it reliable in the cold, but when the cottonseed oil has been heated until it smokes (for one or two minutes), it will remain white. Deiss has tried to apply the test for the detection of cottonseed oil in olive oil, but finds that most of the fixed oils show a more or less similar coloration, with the single exception of lard oil and castor oil.—Apoth. Zeitg. (Rep.), 1891, 81, from Helfenberg. Annalen.

*Olive Oil—Detection of Cotton-seed Oil.*— Dioscoride Vitali furnishes some new reactions: On mixing *pure olive oil* with twice its volume of ether, a yellowish solution is obtained. If now a few drops of a mixture of equal parts of concentrated sulphuric and nitric acids be added, a brisk reaction is started, after the termination of which the liquid becomes almost colorless.

Cotton-seed oil, under the same circumstances, becomes distinctly yellow, and this color also appears in a mixture of both oils, so that a quantity of 10 to 15 per cent. of cotton-seed oil may still be recognized in a mixture.

About 5 c.c. of the suspected oil are put into a test tube, mixed with 10 c.c. of ether, and about 5 drops of the acid mixture are added. When the reaction ceases, the mixture will be colorless if the oil was pure olive oil. But if from 10 to 15 per cent. of cotton-seed oil is present, the mixture is also at first nearly colorless, but on addition of 15 drops more of the acid it will assume a permanent yellow tint. This tint is due to the oxidation of a constituent of the cotton-seed oil, probably its coloring matter, for still better results are obtained by treating the ethereal solution of the oil with chlorinated soda and diluted hydrochloric acid.

The same test will detect oil of sesame, which behaves in the same manner.

But cotton-seed and sesame oil differ in this, that the latter becomes colorless, and *remains so*, when treated with chlorinated soda and hydrochloric acid. Peanut oil, on the other hand, behaves towards chlorinated soda like olive oil. These two oils, however, can be distinguished by the following behavior: On dissolving olive oil in ether, and *carefully* [ ! ] treating this with potassium chlorate and sulphuric acid, there results a colorless ethereal layer, and below it an aqueous, somewhat turbid and whitish layer. In the case of peanut oil the ethereal layer is yellowish-white, while the aqueous one is turbid and reddish-brown. Cotton-seed oil yields a yellow ethereal layer, and a colorless aqueous one. In the case of oil of sesame the latter is green. Sweet oil of almonds behaves like olive oil, but differs from the latter by becoming colored when treated with the acid mixture, and becoming yellow with chlorinated soda and hydrochloric acid.—Am. Drug., July 1891, 219; from L'Orosi.

*Olive Oil—Detection of Sesame Oil.*—Basoletto gives the proportions of the well-known hydrochloric acid-sugar test as follows: Equal weights of the suspected oil and hydrochloric acid (23–24 per cent.) which latter contains 2 per cent. of cane sugar, are mixed by vigorous shaking. After two minutes the mixture is colored reddish, gradually turning darker. Some kinds of otherwise pure olive oil show a reddish coloration which is misleading; A. Gassend recommends, therefore, an addition of sodium hydrosulphite which will remove the coloration of the olive oil, while the red color caused by the presence of sesame oil will continue for from 12 to 40 minutes. 15 c.c. of the olive oil and 10 c.c. of the hydrochloric acid-sugar solution are vigorously shaken, and 2 to 3 c.c. of a 10 per cent. solution of sodium hydrosulphite are added. After 5 minutes the color is observed.—Pharm. Zeitg., 1892, 232.

*Olive Oil—Detection of Cotton-seed Oil in.*—Prof. Dioscoride Vitali furnishes some new contributions towards the problem of detecting cotton-seed oil in olive oil.—American Druggist, (1891, page 219,) quoted from L'Orosi (13, 361, after Chem. Centralbl.).

*Tests of Purity of Olive Oil.*—An examination as to the reliability of certain tests for determining the purity of olive oil. By Prof. S. Canizzaro and Dr. G. Fabris. An abstract of the contents of the pamphlet is given in American Druggist, 1891, 360–362. See page 673.

*Olive Oil—Iodine Absorption.*—O. Bach states that the iodine absorption of the oil as published by Hübl (81.8–83 per cent.) was correct for culinary oils, but the technically important, strongly acid last-pressings varied from 81.6–84.5 per cent.; there also occur in commerce oils, which by all other tests are characterized as pure, having iodine absorptions as low as 79 per cent. (due to the presence of cholesterin in larger quantity) and as high as 89 per cent. (caused by the addition of "denaturirungs-mittel," i. e., substances preventing the use of the article for internal purposes, but not interfering with its use in the arts, as oils of rosemary and turpentine). The following preliminary treatment is recommended for this last class of oils before taking the iodine-absorption: The oil to be examined is placed in a water-bath and stirred with about half its weight of powdered crystallized sodium carbonate; the free fatty acids react with the sodium carbonate with evolution of $CO_2$ and the volatile oils are dissipated; after the completion of the reaction the oil is poured off from the soap, washed with hot water, and in case it becomes turbid, dried in a drying closet until it becomes clear; it is now ready for a reliable iodine-absorption. In this treatment it was noticed that pure Malaga oils retained their green color, whereas in artificially colored oils the green color changed to yellow.—Am. Journ. Pharm., 1891, 461, from Chem. Zeitg., 1891, 1023.

*Olive Oil—Green.*—According to Chem. Drug. much of the green olive

oil at present in the market owes its color to oil-soluble aniline blue.—Am. Drug., 1892, 19.

*Olive Oil—Manufacture.*—Consul Bradley gives some very interesting information, from which we learn that the olives are first crushed to an oily paste in stone mills driven by water (where convenient, and then the paste is packed in flattish grass bags (exactly as linseed), and subjected to pressure in screw presses worked by hand. The oil drains into the receiving tubs, and boiling water is poured over the bags to help the flow and joins the oil in the tubs; finally, the oil is skimmed off. Mr. Brulle has invented a mill which crushes the pulp, and throws out the stone, thereby insuring a better quality of oil.

*Virgin Oil.*—Olives are taken when only three-quarters ripe; these are selected free from any blemish. They are taken, immediately after they are gathered, to the mill, where they are but slightly crushed, so that the pulp alone comes in contact with the millstone; the seed must not be touched, for, though the kernel contains a certain quantity of oil, it is, as connoisseurs know, rather acid, and has not as fine a taste as the oil from the pulp.

This pulp having been crushed without the addition of water, either hot or cold, is gathered in a heap, the centre of which is made hollow in the shape of a funnel.

The oil flows by itself from the inner sides into the centre of the reservoir, from which it is taken with a large ladle.

The oil so prepared is greenish in color, its perfume is exquisite, and it can be kept for many years.

*First-quality Oil.*—For oil of the first quality, called "cannon oil," the olives are placed in the mill without addition of water, if the fruit is freshly gathered. The oily paste is placed in bags made of clean esparto and submitted to the press.

In mills with more modern improvements hydraulic presses are used.

*Second Quality Oil.*—To obtain oil of the second quality, and in order to extract from the pulp all the oil which it contains, they throw the contents of the bags into a vat which is full of cold or warm water; the whole is well stirred up, the broken fragments of the seeds fall to the bottom, while the pulp floats; this is gathered and replaced under the press.

Some pour boiling water over the bags the first time they are put under the press; this simplifies the labor, greatly increases the yield, but reduces the quality.

After all the usual means of extracting oil from the pulp have been employed, 10 per cent. of oil can still be obtained by using bisulphide of carbon.

*Oil Yield.*—The best oil is undoubtedly obtained from olives not fully ripe, for too ripe fruit gives oil which is heavy and without perfume.

Risso says that 100 kgm. of sufficiently ripe and sound olives ought, in a good year, to yield 20 kgm. of good oil and 4 kgm. of inferior quality, and in bad years only 10 of good oil and 2 of inferior.

*Olive Refuse.*—After the oil is extracted the skins and refuse are employed in heating boilers; the muddy substance found at the bottom of the most inferior quality of oil is used as a manure, and, last of all, the broken stones, or "grignons," make a very excellent fuel, which has the advantage of not giving off any carbonic acid gas, as charcoal does.—Am. Drug., July 1891, 197.

*Pure Olive Oil as a Food and as a Medicine.*—By Dr. P. C. Remondino. (Cal. Olive Growers' Convention Proc.)—Western Drug., 1892, 50, 51.

*Olive Oil in the South of France.*—The olive harvest, in ordinary seasons, commences towards the latter part of the month of November, but the oil produced at this period is unsatisfactory, because it is derived from olives collected from the ground; these are dry, diseased and frequently worm-eaten, and give an oil only fit for industrial purposes, lubricating, etc. It is only towards the end of December that the olive commences to yield an oil which can be used for alimentary purposes, and from this date almost to the end of May the oil continues to improve. In January the operation of shaking the trees commences; the fruit which falls is generally unripe and unwholesome, nevertheless it affords an eatable oil, which is brought into commerce under the technical name "Fine" or "Surfine Courante." In March the olive is really ripe, and the gathering from the trees actually commences; from this crop the oil of superfine quality is produced. This stage of the harvest continues through April and May. During the last few weeks of the harvest the fruit yields the "Extra," of exquisite flavor and pale straw color, and capable of retaining all its good qualities for two years, if properly treated. In exceptional years the harvest may continue through June, and gives the oil known as "Arrière-Saison," which is inferior in flavor. In normal years the oil is made and exported thus: "Fines" and "Mi-Fines" at the commencement of January; "Superfines Courantes," the middle of January and February; "Superfines Supérieures," end of February; "Extra" in March, and "Vierge" in April.—Chem. Drug., Sept. 1891, 377.

*Oil of Olive—Production in Spain.*—The annual yield amounts to about 300,000,000 kilos, of which nearly half represents the production of the provinces of Andalusia, Cordova, Seville and Jaen. Of the forty-nine Spanish provinces only seventeen do not cultivate the olive. Fourteen produce only the oil necessary for home consumption. Salamanca produces the least oil, 437,000 kilos., and Cordova the most, 55,200,000 kilos. About 140,000,000 kilos. are required for home consumption; there only remains, therefore, for exportation 160,000,000 kilos.—Chem. and Drug., July 11, 1891, 36.

*Olive Oil—In Persia.*—From an article in Chem. and Drug., July 25, 1891, 154, we gather that the principal olive-growing district consists of 43 villages, which possess about 100,000 trees, yielding from 6 to 9 pounds of olives per tree per annum. The quantity of good oil is about 17 per cent. of the olives; the method of obtaining it is very antiquated and wasteful.

*Oil of Sesamum—Detection in Olive Oil.*—See *Oil of Olive.*

ORCHIDEÆ.

*Some Commercial Vanillas.*—By George M. Beringer. (Am. Jour. Pharm., 1892, 289–294.) With a view of ascertaining the character and quantity of vanilla consumed in the United States, the author addressed a circular letter to all the known importers and the larger wholesale dealers, requesting samples and such information as they were willing to impart. The results are brought in this paper.

While epiphyte in its character, clinging to forest trees for support, it is not parasitic, obtaining its support principally through its aërial roots, which drop to the ground, and in many of the cultivations in the islands of the Indian Ocean the plants are supported for a considerable length upon rude trellises.

The products of the Java vanilla cultivations are exported to Holland, and do not reach this country; the varieties entering our markets being the Mexican, Bourbon, Seychelles, Mauritius, Tahiti, South American and Vanillons, with occasionally a few pounds of unknown origin brought in by trading vessels. The products of Mauritius and Seychelles are usually shipped to London, while those from the French possessions, Reunion, Tahiti, Mayotte, etc., go to France.

U. S. Consul Horace G. Knowles, of Bordeaux, reports (see U. S. Consular Reports, Sept., 1891, 127) as follows: Paris, London and New York are the markets of the world for vanilla. The greater portion imported into France comes from her colonies, Guadaloupe, Madagascar (Sainte Marie), Mayotte, Reunion and Tahiti. Just what the products have been may be judged from the following table:

| | Reunion. | Guadaloupe | Mayotte. | Sainte Marie. | Tahiti. |
|---|---|---|---|---|---|
| | *Pounds.* | *Pounds.* | *Pounds.* | *Pounds.* | *Pounds.* |
| 1880 | 164,289 | — | — | — | — |
| 1885 | 155,548 | 9,532 | 2,640 | 8,800 | 18,350 |
| 1886 | 361,587 | 12,100 | 4,774 | 18,260 | 5,500 |
| 1887 | 417,230 | 6,820 | 2,596 | 16,610 | 6,600 |
| 1888 | 462,660 | 9,044 | 19,195 | 19,195 | 6,490 |
| 1889 | 506,462 | — | — | — | 7,018 |

*Mexican Vanilla.*—The finest vanilla is still produced in Mexico, where

it has been cultivated for nearly a century. Mr. C. E. Hires (*loc. cit.*) states that the pods are collected in the fall, November or early December, when nearly mature; the processes of curing, sorting and packing requiring from four to five months, the crop of this year reaches the market in the spring and summer of the next. The erroneous statement is still made in the U. S. Dispensatory that the fruit is collected in the spring. This is the time of flowering, but according to all authorities it will require nearly six months for the fruit to be perfected. Since the extensive cultivation of vanilla in Reunion and other French provinces, the exportation of the Mexican to France has rapidly declined. At the present time, the United States afford the principal market for this product. The receipts for recent years were as follows:

| | | |
|---|---|---|
| 1885 | 806 cases. | 100,750 pounds. |
| 1886 | 605 " | 75,625 " |
| 1887 | 1,023 " | 127,875 " |
| 1888 | 829 " | 103,625 " |
| 1889 | 852 " | 106,500 " |
| 1890 | 947 " | 118,375 " |
| 1891 | 1,087 " | 135,875 " |

The crop of 1890–1891 was the largest ever grown. Prime Mexican vanilla is from 8 to 10 inches long, flattened, and about 3/8 inch in diameter at the broadest part. Its upper end or end of attachment tapers gradually for about one-quarter of the length of the pod, and is usually curved and slightly twisted toward the point. The lower end is but slightly attenuated. The color is a dark-brown and the odor is pleasant, aromatic and characteristic. The surface is ridged longitudinally, the ridges being interspersed with finer striations and warty excrescences. The pod feels firmly plump and while fresh the surface is somewhat viscid, but nevertheless there is a roughness to the touch which becomes more pronounced as it gets older and drier. Acicular crystals commence to form at the ends and gradually extend over the surface. The interior is filled with numerous small black seeds and a small quantity of pulp.

*Bourbon Vanilla.*—The cultivation of vanilla in Reunion was commenced nearly half a century ago, and has been steadily on the increase until now probably 3,000 acres are under cultivation. In 1849 only 3 kilogrammes were exported from Reunion, in 1861 this had been increased to 40,000 pounds, and in recent years has not fallen below 200,000 pounds. The quality of the Bourbon vanilla has likewise undergone considerable improvement, so much so that many of the published descriptions in the text-books do not fairly describe the product in our markets to-day. The best qualities are from 7½ to 8½ inches long and ¼ to 5/16 inch in width at the broadest part. The lower end is but slightly attenuated and the upper gradually tapers, commencing about 1½ to 2 inches from the point, and is twisted and turned in. In size and general appearance, they closely

FIG. 17.

South America. Bourbon. Mexico. Wild Vanilla, Guadaloupe.

FIG. 18.

Tahiti. Seychelles. Mauritius. Wild Vanilla, Martinique.

Commercial Vanillas.

(*Reduced to about three-eighths natural size.*)

resemble the Mexican, and are now packed in bundles closely simulating that variety. In color they are of a dark brown, almost black. The odor is not unpleasant, but is unlike the Mexican, being more like that of Tonka. The difference in odor becomes very pronounced on steeping a piece in hot water. The surface is longitudinally wrinkled, the striations being coarse and deep. To the touch the *surface is smooth and waxy*, and soon *becomes covered with a coating of acicular crystals*, known in the trade as "*frost.*" It is not as firmly fleshy as the Mexican. The vanillas from the Seychelles and Mauritius are commonly sold in this country as inferior Bourbon. The total imports of the three varieties in 1891 amounted to about 10,000 pounds.

*Vanilla from the Seychelles and Mauritius.*—These varieties are very similar in character. Samples of Seychelles examined were 6 to 6½ inches in length, not much flattened, being in many instances nearly round and only $\frac{3}{16}$ to $\frac{1}{4}$ inch in width, tapering for about one to one and a half inches to the upper end, which is generally twisted. The longitudinal ridges are broad and flattened. It is characterized by its pale color, faint odor and small size. After a time a few crystals appear on the surface, which is smooth, but not as waxy as that of the Reunion vanilla. These crystals frequently assume a flat or tabular form.

The Mauritius fruit is similar to the Seychelles in color, shape and surface characters, but is generally somewhat smaller.

*South American Vanilla.*—Recently the quantity of South American vanilla imported has been quite large. In 1891 it amounted to about 9,000 pounds. The principal outlet is most likely as an adulterant of the Mexican cut beans, as in this form it becomes a dangerous adulterant. In the entire bean the difference is easily recognized. It is from 6½ to 7½ inches in length and quite broad and flattened, being usually half an inch or more wide, slightly tapering at the lower end, and at the upper quite sharply attenuated an inch or so from the point. The color is of a reddish brown and the odor is very rank, resembling somewhat that of fermented molasses or rum. It is *very pulpy* and extremely resinous. The surface is distinctly wrinkled and smooth, being intermediate in feel between the Bourbon and the Mexican.

The pods appear to be collected when nearly ripe; frequently they are split, and seeds are seen all over the surface. There are but few crystals appearing on the surface. Transverse sections showed the pericarp to be very thin at the edges, and to consist largely of broken-down dark reddish brown cells.

*Tahiti Vanilla.*—The vanilla produced in the Island of Tahiti and in the Sandwich Islands is all sold under the name of Tahiti vanilla. It is largely consumed in the Pacific and Western States. Some years ago a considerable quantity was disposed of in Philadelphia among the retailers, being offered as *transplanted Mexican.*

The imports in 1891 amounted to 5,000 pounds. They are 6 to 7 inches long, broad and flat, about ⅜ to ½ inch in width. The color, odor and external markings are similar to the South American. They taper for a short distance to the lower end, and are sharply attenuated and twisted toward the upper end. They are likewise very pulpy.

*Vanillons.*—While some few wild or uncultivated vanillas are collected in Mexico, the bulk of those entering commerce are obtained from the West Indies, Guadaloupe and Martinique being the principal places of export.

Their principal consumption is among the tobacco manufacturers, and perfumers for the manufacture of sachet powders.

They are from 4 to 5 inches in length, ⅜ to ¾ or even 1 inch in diameter, frequently sharply angled, exhibiting almost a triangular shape on cross-sectioning. They are nearly the same diameter for the greater portion of their length, being attenuated at both ends. They are brown to a red-brown in color and longitudinally ridged. The transverse markings, due to their being wrapped with twine during the process of curing, give them a curious twisted appearance. They are generally split open and lack almost entirely the odor of vanillin, their odor being compared to a cross between a fermented sugar and heliotrope odor. They are devoid of any crystalline efflorescence.

[The characters of the different commercial varieties of vanilla are not all correctly shown in the cut, some of the curved ends being too angular, and the stigmatic surfaces, and, in some cases, the attenuations, not sufficiently distinct.]

*Vanilla planifolia*, Andrews.—An account of the history and bibliography of Vanilla, by Jos. D. Hooker. A large colored plate is given, which was made from a Kew plant in May, 1890, obtained originally from the Duke of Northumberland's Gardens at Sion House. On numerous occasions during the past ten years the Sion House plants, as also the Kew plants obtained from them, have produced mature pods. These are about eight or nine inches long, somewhat slender, and possess the characteristic aroma of true vanilla.—Bot. Mag. T., 7167, April 1, 1891.

*A New Color Reaction for Vanillin.*—In the various reference books on organic chemistry there is to be found especially one color reaction for vanillin, namely, a violet-blue color, with ferric chloride. Mr. Frank X. Moerk of Philadelphia examined a vanilla substitute, consisting of vanillin and coumarin, and had some difficulty at first in obtaining the above color reaction, caused by using too much ferric chloride solution and this solution containing free hydrochloric acid. He then experimented with a ferrous solution and oxidizing this with bromine water. The method of applying the test was to add to the aqueous vanillin solution a few drops of a 1 per cent. ferrous sulphate solution and then the bromine water, drop by drop; in very dilute vanillin solutions a single drop of bromine water

is sufficient; in more concentrated solutions the color deepens with the addition of more bromine water until the maximum intensity is reached, when more bromine water causes a yellowish clearing of the bluish-green test. If the bromine water be added rapidly drop by drop, until the yellow coloration results, and the test be set aside for a few minutes, the original bluish-green color reappears with full intensity.

If too much bromine water be added at once, or if it be added slowly until the yellow color results, the bluish-green color will not reappear.

The test succeeds in solutions of vanillin 1 : 100,000, and then is more easily recognized than is the ferric chloride test with vanillin solutions 1 : 2,000.

The presence of free acid does not interfere much with the intensity of these colors, and hence the test would seem to depend upon the action of bromine upon vanillin, and then the further action of this compound upon the salts of iron, especially ferrous salts.

That this is the case can be proven by carrying out the test in a manner which will enable one to detect one part vanillin in 200,000 parts of solution:

To the vanillin solution is added a drop of bromine water or sufficient to impart the odor of bromine, and then a freshly prepared solution of ferrous sulphate is carefully added in slight excess, that is, a drop or two are added after the bromine odor has disappeared. Coumarin not giving this color reaction, it can be used to estimate approximately the vanillin in mixtures of vanillin and coumarin as they are used in the vanilla substitutes; to do this the same weights of vanillin and the substitutes (about 50 milligrams) are dissolved each in 100 c.c. of water; of this solution 5 c.c. are taken, diluted with about 10 c.c. of water, and bromine water added drop by drop until, after agitation, the bromine odor is permanent, then add of a freshly prepared 1 per cent. ferrous sulphate solution until the bluish-green color no longer intensifies; lastly, dilute with water the two tests until they are of the same tint.

A comparison of the two volumes will give the percentage of vanillin in the substitute, if, for instance, the vanillin solution measures 75 c.c. and the substitute solution 50 c.c., then

$$75 : 50 :: 100 : x = 66.66 \text{ per cent.}$$

—Am. Jour. Pharm., 1891, 521–523.

*A Colorimetric Estimation of Vanillin.*—A pure extract of vanilla gives with salts of iron when largely diluted with water a peculiar violet-brown coloration. Mr. Moerk decolorizes the solution with freshly precipitated lead hydrate.

The determinations were made as follows: 2 c.c. of the samples were diluted with about 50 c.c. water, 10 c.c. of the lead hydrate mixture added, and then sufficient water to make 100 c.c.; after standing a few minutes, the mixture was filtered through a dry filter, 50 c.c. removed to a flask of

100 c.c. capacity, bromine water added, drop by drop, until after agitation the bromine odor was permanent, then a 1 per cent. ferrous sulphate solution until the intensity of the color was reached, lastly, water added to make 100 c.c., and, after standing about an hour, filtered. One c.c. extract by this test will form 100 c.c. of a more or less colored solution; two standard solutions were made: one containing 0.002 and the other 0.0005 vanillin in 100 c.c. of the test; the comparisons were made in large test tubes, the different height of the columns being inversely proportional to the amount of vanillin present. With colorless solutions of vanillin there is no difficulty in accurately determining the amount of vanillin present, but in colored solutions there is a yellowish tinge to the test which renders accurate comparisons impossible. While this color reaction is not suited for the accurate estimation of vanillin extracts and colored substitutes, still it allows a reliable comparison of these preparations; this was found to be the case in the samples prepared for me by Mr. Beringer; while the true amount of vanillin would not be given by the test, still I could invariably say which contained more than another. An important point to be noted in this connection is that while the odor of vanillin is destroyed in this test, that of coumarin is not affected, so that the test will serve to give an idea as to the value of a vanilla preparation and also to detect small quantities of coumarin in presence of vanillin.—Am. Jour. Pharm., 1891, 572–574.

*Vanillin and Isovanillin.*—On the assumption that the two hydroxyl groups of protocatechuic aldehyde possess different degrees of affinity, Bertram has devised methods of obtaining the two isomeric methyl-ethers of protocatechuic aldehyde.—Pharm. Centr., xxxiii., 78; Phar. Jour. and Trans., 1892, 691.

*The Mauritius Vanilla Crop.*—Chem. and Drug., 1892, 772, 773.

*Vanilla.*—Report by Consul Knowles, of Bordeaux. (Pharm. Era, Dec. 1891, 360, 361.)

PALMEÆ.

*Alkaloids of the Areca-nut.*—Of the three alkaloids present, two, arecoline and arecaine, have been described at length in the Am. Jour. of Pharm., 1889, 133 and 193; the third, *arecaidine*, $C_7H_{11}NO_2.H_2O$, isomeric with arecaine, is present to the extent of 0.1 per cent.; it forms colorless, permanent, tabular crystals, and is easily soluble in water and dilute alcohol, but almost insoluble in absolute alcohol, ether, chloroform and benzol; it loses its water of crystallization at 100° C., and melts, attended with frothing, at 222–223° C.; it forms crystallizable salts and is precipitated by platinic and auric chlorides (arecaidine platinochloride melts at 208°–209°, arecaine platinochloride at 213–214°; arecaidine aurochloride at 197–198°; arecaine aurochloride at 186–187°). Arecoline is methyl-arecaidine, and it has been possible to convert one into the other; ethyl-

arecaidine, called *homarecoline*, $C_9H_{15}NO_2$ has also been made, and, like arecoline, is poisonous, whereas arecaidine is not poisonous. E. Jahns (Ber. d. D. Chem. Ges.), Pharm. Ztg., 1891, 516; Am. Jour. Pharm., Oct. 1891, 483.

*New Alkaloid in the Areca Nut.*—In a recent communication, E. Jahns announces the discovery of a new alkaloid which he calls *guvacine* (from Guvaca, the old Indian name for the areca palm); it has the formula $C_6H_9NO_2$ and differs from *arecaine* and *arecaidine* by minus $CH_2$ and from *arecoline* by minus $(CH_2)_2$. It crystallizes in small, lustrous scales, easily soluble in water and dilute alcohol, insoluble in strong alcohol, ether, chloroform and benzol; at 265° C. it becomes dark in color, and melts at 271–272° with decomposition. It forms salts of acid reaction having the same solubilities as the base.—(Ber. d. D. Chem. Ges.) Pharm. Ztg., 1891, 671; Am. Jour. Pharm., 1891, 601.

*Oil of Betel—Constituents.*—According to Schimmel and Co., oil of betel, distilled from the fresh leaves in Java, contains besides terpenes and some other bodies, chavikol and betelphenol. The oil distilled from the dried Siam leaves contains sesquiterpene and betelphenol. The oil distilled from the fresh leaves in Manila contains no other phenol but betelphenol. Betelphenol is thus the characteristic constituent of oil of betel. —Apoth.-Zeitg. (Rep.), 1891, 115.

*Copernicia cerifera, Mart.*—Palma negra; Caranday or Caranda; Carnaüba. This palm tree grows in Brazil and Paraguay, and is described by Dr. Morong in the Bulletin of Pharmacy, 1892, 19–22. The interior wood, unlike that of most palms, is very compact and solid. It is exceedingly heavy, and sinks in water like lead. The cabbage, borne at the summit of the trunk, is tender, sweet and juicy. The leaves serve a great variety of purposes. As a building material the black palm is far superior to its companions. The well-known Carnaüba wax is obtained from the leaves and berries of this palm, and might be obtained from Palma blanca and Palma Colorado, as the cereine deposit is formed on the leaves of all of them. This wax on account of its hardness is of much economical value.

*African Palm Oil.*—Kew Gardens Bull., July 1891. An article on the palm oil industry of the Western coast of Africa.—Jour. Soc. of Chem. Indus., 1891, 707, 708.

*Palm Oils—The Fatty Acids of.*—By H. Nördlinger (Ztschr. f. Ang. Ch., 1892, S. 110).—Deut. Chem.-Zeit., 1892, 85.

*Palm-Nut Oil—Adulteration.*—According to Seifensieder Zeitg. the artificial oil consists of a mixture of yellow pitch and lard, colored with turmeric, and perfumed with orris root. The artificial oil will keep its color on exposure to light and air, while the genuine oil will bleach soon. —Pharm. Post, July 1891, 496.

PAPAVERACEÆ.

*Argemone Mexicana*, Linné.—An account of the history, habitat and properties of the drug.—Chem.-Zeitung, 1892, 422.

*Bocconia.*—This botanical genus is described by Dr. H. H. Rusby in the Bulletin of Pharmacy, 1891, 355–361. A tree found in the Andes by him with leaves nearly two feet long, and possessing the peculiar venation and cut-lobing of the Papaveraceæ. Upon being wounded it exuded a stream of an orange-red or vermillion color. The plant was used by the natives in conquering colds of all kinds. The leaves were used to restore infants suffering with the pernicious fever of the country. Perhaps the most important use of the drug was for the production of abortion. The powder of the drug produces the most painful sneezing, and other symptoms of coryza. The plant has been collected in Ecuador, West Indies and Mexico. Mr. Pringle obtained from Mexico two new species, B. latisepala, Watson, and B. arborea, Watson. The latter was analyzed by Prof. Elliott, who found the presence of a peculiar resin in large quantity, and of one, and probably two, alkaloids, one of which is apparently *Sanguinarine* and a glucoside, has been established. A description of the barks of B. pubescens and B. arborea are given, with their botanical descriptions, as well as that of the genus Bocconia. The paper is profusely illustrated.

*Corydalis cava, Alkaloids of.*—By F. Adermann (Chem. Centr., 1891, 1, 978, 979). The author isolated three bases from the root. The first is isomeric with the hydroberberine of Court; (2) similar to caffeine, and (3) the author names corydaline, which resembles Reichwald's fumarine. —Journ. Chem. Soc., 1891, 1266.

*Cryptopine.*—The formula assigned by Hesse, $C_{21}H_{23}NO_5$, has been confirmed by D. R. Brown and W. H. Perkin, Jr., from the analysis of the oxalate. The authors find that, on oxidation with potassium permanganate, cryptopine yields among other products a crystalline acid, $C_{10}H_{10}O_6$, of melting point 179°–180° C., which proves to be metahemipinic acid, which up to the present time has only been obtained from papaverine.—Chem. News, 1891, lxiv., 317.

*Opium Smoking by the Chinese in Philadelphia.*—In an article prepared for the Public Ledger (Aug. 19, 1891), Mr. Stewart Culin describes the practice of opium smoking in Philadelphia. He describes the preparation of opium for smoking in China. Smoking opium is not prepared from the crude drug to any extent in the United States. A tax of ten dollars per pound is levied under our internal revenue laws upon opium manufactured in this country. No one who is not a citizen of the United States is permitted to engage in its manufacture, and bonds must be given in the usual manner. He describes: Opium refuse mass; the pipes; opium boxes; smokers. If the importations of prepared opium through the Custom House are an indication, it would appear that there is a considerable

decline in the use of the drug. In 1880 the total importations, which had been gradually increasing, amounted to 77,196 pounds. For May 31, 1890, according to information kindly furnished by Mr. S. G. Brock, Chief of Bureau of Statistics of the Treasury Department, the importations were 29,955 pounds, and for the corresponding months of the present year, 66,549 pounds. The illegal importations, concerning the amount of which it is impossible to obtain information, render conclusions based upon these returns very uncertain.—Am. Jour. Pharm., 1891, 497–502.

*The Opium Used in Medicine.*—E. M. Holmes says, "There is no reason why India, instead of Turkey, should not supply the whole world with medicinal opium." In this article he calls the attention of the Indian government to the manufacture of an opium capable of competing with the Turkish article in European and American markets.—Phar. Jour. and Trans., 1891, 252, 253.

*Opium Production and Smoking in China.*—P. L. Simmons, F. L. S.—Bull. of Pharm., 1891, 554–557.

*Indian Opinm.*—Dr. George Watt, reporter on economic products with the government of India, in an article which was written for the Dictionary of the Economic Products of India, deals fully with the history and trade in poppy seed and manufacture of oil therefrom.—Chem. and Drug., 1891, 612, 613.

*Opium—Its Cultivation, Collection, Preparation, etc.*—Pharm. Era, March 1891, 145, 146, 177, 178.

*The Ferment of the Opium of Smokers and its Artificial Fermentation.*—By M. Calmette. (Chem. News, from Revue Scientifique.)—Pharm. Review, 1892, 73, 74.

*Opium Powder of Commerce.*—B. F. Davenport found in seven samples the following percentages of morphine: 10.7–10.8, 11.3–11.8, 11.6–11.7, 12.0–12.1, 12.3–12.4, 12.4–12.5, 12.5–12.6.—Am. Drug., 1891, 347.

*On the Action of Apomorphine and Apocodeine.*—Dr. W. Murrell has administered apomorphine during the last few years as an expectorant with successful results. Most of the patients treated by Dr. Murrell with large doses of apomorphine were suffering from bronchial catarrh or chronic bronchitis, and the drug exerted a powerful expectorant action without producing either nausea or emesis, the large doses being much more effective than smaller ones.

He has used apomorphine made into an ointment, and found it a valuable form of administration, especially useful in the case of children. The ointment was of strength ½ grain in ½ ounce of lard, and was rubbed on the chest before the fire at bed-time. He has used it in the form of a spray with marked results.

In a few cases a narcotic effect has been described as occurring after apomorphine, but Dr. Murrell thinks this is either imaginary or due to a mixture of apomorphine with morphine.

Apomorphine has the advantage of compatibility with morphine. It may be given in cases of opium poisoning as an emetic, and as an expectorant the combination is very useful, especially in cases of phthisis.

In the majority of the cases treated by the author, the drug was given in mixture with syrup of wild cherry, syrup of tar, and syrup of lemon.

It is well known that a solution of apomorphine changes color after a time, becoming dark green after exposure to light and air. The change of color seems to have no harmful effect.

Apocodeine ($C_{16}H_{19}NO_2$) bears the same relation to codeine as apomorphine does to morphine containing an equivalent less of $H_2O$. It is insoluble in water; the hydrochlorate is partly soluble. Dr. Murrell's experiments have led him to the same conclusion as Dujardin-Beaumetz, who has described it as possessing properties of apomorphine in a modified degree.—British Medical Journal; Med. Chronicle, June 1891; Am. Jour. Pharm., 1891, 541–543.

*Apocodeine Chlorhydrate.*—(Berichte von E. Merck, in Darmstadt, 1892.)—Jour. Pharm. Chim., 1892, 250.

*Codeine—Reactions.*—For an explanation of the Roman numerals employed see under Chemistry.

M. P. 150° C. (anhydrous crystals). $C_{17}H_{17}O.C_3H.NO + H_2O$.

*a.* If heated above the melting point it turns dark green and then brown.

*b.* Soluble in 80 parts of water at 15° C., in 17 parts at 100° C. Excessive amounts of codeine change to an oil when their aqueous solution is boiled, but crystallize out again on cooling. The solution turns litmus blue. Also soluble in ether, chloroform, alcohol, benzene, and carbon bisulphide, but not in petroleum ether.

*c.* Aqueous solutions of codeine (1 to 80) are made turbid by reagent IV, which turbidity passes away on standing, but returns on the addition of more of the reagent. Reagent VI acts similarly.

*d.* Reagents VII, VIII, IX, XVII and XVIII precipitate codeine solutions, but reagents X, XI and XVI do not.

*e.* Codeine solutions do not precipitate aluminium hydroxide from solutions of aluminium salts, but if heated slightly with a small amount of reagent XXI, there is formed a precipitate of ferric hydroxide, and some of the ferric chloride is reduced to ferrous chloride, as can readily be seen by adding to the solution a few drops of reagent XI.

*f.* If a few crystals of codeine be strewn upon a paste composed of 20 milligms. of ammonium molybdate and 5 drops of reagent XIII, a green color changing into blue will at once be produced.

*g.* If titanic acid ($TiO_2$) be used instead of ammonium molybdate, in

the foregoing experiment, no reaction will take place with codeine, thus distinguishing it from morphine (which see).

*h.* Codeine will not affect a mixture of 0.1 gm. of potassium iodate ($KIO_3$), 5 c.c. of water and 5 drops of acetic acid, even if heated with it, thus differing from morphine (which see).

*i.* Make the following solution: 75 milligms. of potassium ferricyanide and 1 c.c. of reagent XXI in 200 c.c. of water. Codeine when brought in contact with this solution turns it dirty green to brown (difference from morphine).

*j.* 50 milligms. of codeine, if strewn upon 2 c.c. of reagent XV, become red, while the acid turns yellow.

*k.* Codeine is not changed in color when heated with and dissolved in reagent XIII; if, however, the mixture be stirred with a glass rod having a trace of reagent XXI upon it, it will turn gradually green, then violet, and finally blue, if heated on a water-bath. Chloroform will not take up this blue color, but an excess of water or alcohol will destroy it.

*l.* If the solution of codeine in reagent XIII be stirred with a glass rod having upon it a trace of reagent XV, it will become green and finally violet and black.

*m.* Strong chlorine water will cause codeine to turn red, especially if a little of reagent I be present.

*n.* If tungstic acid or a tungstate be used instead of ammonium molybdate in experiment *f*, there will be formed a slightly bluish color, which, however, soon vanishes, thus distinguishing codeine from morphine, as the latter gives a decided color in this case (see morphine).—Pharmaceutic Review, 1892, 27.

*Note on Codeine Sulphate.*—Jos. W. England has observed that in using a certain firm's make of sulphate of codeine, upon dissolving it in water there remained an insoluble residue which was completely soluble upon the addition of dilute sulphuric acid. The amount was 7.7 per cent., and proved to be the alkaloid codeine.—Am. Jour. Pharm., 1892, 120.

*A Violet Coloring Matter from Codeine.*—By P. Cazeneuve (Compt. rend., 113, 747–749). 10 grammes of codeïne is heated with 10 grams of paranitrosodimethylaniline in presence of a litre of ethyl alcohol of 93° for 300 hours. When the liquid cools, it deposits tetramethyldiamidoazobenzene. The alcohol is distilled off and the residue boiled with water; after cooling, the liquid is filtered and agitated with amyl alcohol, which dissolves out the violet coloring matter, whilst a beautiful blue coloring matter remains in the water. When the amyl alcohol is evaporated, the violet compound separates in amorphous, lustrous flakes, somewhat soluble in water, but especially soluble in alcohols and in ether, forming dichroic solutions. When the aqueous solution is poured on to strong sulphuric acid it gives, like the safranines, a green zone changing to blue and then to violet, which

indicates the presence of poly-acid combinations. The morphine violet gives a similar reaction.—Jour. Chem. Soc., 1892, 360, 361.

*Pseudocodeïne*—By E. Merck (Arch. Pharm., 229, 161–164). Pseudocodeine, a strong base discovered during the preparation of apocodeïne. The physiological action of pseudocodeïne is similar to that of codeine, but weaker.—Jour. Chem. Soc., 1891, 1121.

*Cryptopine.*—D. Rainy Brown and W. H. Perkin, Jr.—Proc. Chem. Soc., 1891, 166, 167. The authors have commenced an investigation of the rare alkaloid cryptopine, which occurs in small quantities in opium.

*Morphine—Action on the Intestines, as compared to Opium.*—See under *Opium.*

*Morphine—Reactions.*—For an explanation of the Roman numerals, see under Chemistry.

M. P. about 200° C. $C_{17}H_{19}NO_3+H_2O$.

*a.* Soluble in 500 parts of water at 100° C., and in about 5000 parts at 15° C. Turns litmus blue.

*b.* Slightly more soluble in methyl alcohol, amyl alcohol, acetone, and ethyl acetate; soluble in 100 parts of alcohol at 15° C.; very sparingly soluble in benzene, chloroform and carbon bisulphide; almost insoluble in ether.

*c.* Soluble in alkalies, such as sodium and potassium hydroxide solutions, also barium hydroxide and lime water; these alkaline solutions, however, soon turn brown.

*d.* On moistening morphine with water and adding a few drops of reagent XXI., a blue color is produced in the liquid, while the morphine becomes coated with ferric hydroxide. Dilution will not alter the blue color. The liquid will also give the reactions for a ferrous salt.

*e.* Morphine strewn upon reagent XIII. generates a greenish color after the lapse of a few minutes; however, if the mixture be touched with a glass rod having upon it a trace of reagent XV., the color will change to dark purple or brown, and on the addition of more reagent XV. to a red color.

*f.* Morphine crystals strewn upon reagent XV. turn red at once and color the acid yellow, especially if the latter had been diluted with water.

*g.* A purple color will be produced by strewing morphine upon a thin layer of a mixture of 20 milligms. of ammonium molybdate and 5 drops of reagent XIII. If titanic acid ($TiO_2$) be used instead of the molybdate, the purple color will change very quickly to violet and reddish brown. Tungstic acid ($WO_3$), or a tungstate, act similarly, and bismuth will, under the same conditions, yield a dark brown or black color.

*h.* Morphine dissolves in reagent XIX. with a greenish color which may change to brown.

*i.* Morphine in solution when treated with the following mixture, 75 milligms. of potassium ferricyanide and 1 c.c. of reagent XXI. in 200 c.c.

of water, yields a green color followed by a blue precipitate. Many substances such as cork, paper, starch, sugar, etc., produce this same reaction, but it takes place instantaneously only in the case of morphine. It is essential that the above mixture be freshly prepared for each experiment.

*j.* 100 milligms. of potassium iodate, dissolved in 5 c.c. of water to which 5 drops of acetic acid have been added, can be heated on a water-bath without undergoing any change; as soon, however, as a trace of morphine be added, iodine is liberated and can be dissolved out by chloroform. Bromine is similarly liberated from potassium bromate, but chlorine is not set free from potassium chlorate under these conditions.

*k.* If 20 milligms. of morphine be rubbed together with 10 milligms. of sugar and 2 drops of reagent XIII. a rose-colored mixture will be formed.

*l.* Seventy parts of reagent II. will dissolve one part of morphine, very slowly, however; the solution soon turns brown, and if chlorine water be added it readily turns red.

*m.* Strong chlorine water, when shaken up with morphine or its salts, becomes yellow in color; on adding reagent I. a reddish brown zone is formed, and the liquid gradually becomes dark brown in color.—Pharm. Review, 1892, 47.

*Morphine Violet Coloring Matter.*—P. Cazeneuve prepares it by boiling 7 gm. of morphine for 100 hours in a reflux apparatus with an equal molecule (5 gm.) of paranitrosodimethylaniline hydrochloride and ·500 c.c. of methyl alcohol. A crystalline compound separates, having all the properties of the tetramethyldiazoamidobenzene formed by the action of aniline on paranitrosodimethylaniline. The alcoholic liquid is evaporated to dryness, the residue treated with hot water, the solution filtered, the filtrate again evaporated to dryness, and dissolved in dilute hydrochloric acid. The base is precipitated from the violet solution by soda, washed to free it from morphine, and the violet compound taken up by amyl alcohol. It dyes wool, silk and gun-cotton directly, but fades when exposed to light. Its composition is $C_{17}H_{19}NO_4.N.C_6H_4.NMe_2$.—Journ. Chem. Soc., 1891, 1120, from Comptes rendus, cxii., 805–807; Drug. Circ. and Chem. Gaz., 1891, 154.

*Morphine—Estimation by Means of the Polariscope.*—By A. Lambert (Jour. Pharm. Chim., 5, Ser. 23, 593).—Chem. Zeitung, 1891, 194.

*Morphine and Narcotine in Opium.*—Adrian (Jour. Pharm. Chim., 1891, xxiv., 526) estimated the amounts of these two alkaloids in 38 samples of opium. The percentage of morphine varied from 6.75 per cent. to 12.15 per cent., in quite a number of cases being 8–9 per cent., the normal being about 10 per cent. Narcotine varied even more than morphine, the normal percentage being 2.5 per cent. One sample showed as high as 3.97 per cent., while two others showed 0.5 and 0.1 per cent. respectively. The sample with 0.1 per cent. of narcotine contained 10.075 per

cent. of morphine, and the one with 3.97 per cent. of narcotine, 9.7 per cent. of morphine.—Chem. Drug., 1892, Jan., 51, from Nouv. Remèdes; Am. Jour. Pharm., 1892, 135.

*Antidote for Morphine.*—Kossa (Monit. Pharm., Dec. 1891, p. 1007), through experiments with lower animals, finds that administration of picrotoxin and paraldehyde at the same time had the desired effect. The paraldehyde was given to counteract the contraction of the respiratory muscles produced by the picrotoxin. The latter does not act as an antidote in morphine poisoning.—Am. Jour. Pharm., 1892, 135.

*Morphincarbonic Ether.*—By R. Otto and A. Holst (Labor. techn. Hochschule, Braunschw,. Arch. d. Pharm., 1891, Bd., 229, S. 618). Deut. Chem.-Zeit., 1892, 43.

*Narceine.*—According to Mr. Dott, narceine is practically insoluble in pure chloroform.—Pharm. Jour. and Trans., 1892, 747.

*Narceine—Reactions.*—For an explanation of the Roman numerals see under Chemistry.

M. P. about 160° C. $C_{23}H_{29}NO_3 + 2H_2O$.

*a.* Readily soluble in alcohol, but sparingly so in ether, benzene, chloroform and carbon bisulphide. Soluble in 100 parts of water at 100° C., and in 425 parts at 15° C. Its solutions do not affect litmus.

*b.* Readily soluble in reagent II; the solution, however, soon turns yellow, and with chlorine water yields a red color.

*c.* Reagent XXI does not affect narceine, nor does the mixture of ferric chloride and potassium ferricyanide mentioned under morphine in experiment *i*.

*d.* Narceine strewn upon reagent XIII colors the latter, first yellowish brown, then red and reddish brown; if the mixture be stirred with a glass rod having a trace of reagent XV upon it, it will turn purplish brown.

*e.* Dilute sulphuric acid (1 : 10) when evaporated with narceine becomes cherry red.

*f.* Reagent XV when dropped upon narceine becomes red and then yellow.

*g.* By treating narceine as mentioned in experiment *g*, under morphine, and using ammonium molybdate, narceine gives a brownish green color which changes to blue. With titanic acid, under the same conditions, a violet color is obtained which changes to yellowish brown and finally to a chocolate brown. Bismuth nitrate acts as in the case of morphine, but the black paste soon assumes a purple color.

*h.* Narceine does not decompose potassium iodate as morphine does.

*i.* Into a test tube containing an aqueous solution of narceine drop a few crystals of iodine; in the course of an hour or so, each crystal will be found to be surrounded completely by a mass of fine needles, the color of which varies between blue, grey and green. On drying they assume a glistening grey color. This reaction also holds good for narceine salts.

*k.* Sugar and reagent XIII yield with narceine a greenish yellow mixture.

*l.* Reagent VI produces in solutions of narceine an amorphous light yellow precipitate.

*m.* Chlorine water dissolves narceine without producing a change in color; as soon, however, as a few drops of reagent I are added to the liquid, this turns red.

*n.* Reagents VII, VIII, IX, X and XI cause no change in solutions of narceine.

*o.* Reagents XVII and XVIII form amorphous precipitates very readily when added to narceine solutions.—Pharm. Review, 1892, 47.

*Narcotine* has been proven to be methyloxylated hydrastine by Ernest Schmidt.—Apotheker Ztg., 1891, 522; Am. Jour. Pharm., 1891, 539.

*Narcotine—Reactions.*—For an explanation of the Roman numerals see under Chemistry.

M. P. 176° C. $C_{22}H_{23}NO_7$.

*a.* Soluble in alcohol, ether, benzene, chloroform and carbon bisulphide, but almost insoluble in water.

*b.* Red litmus paper remains unaffected if crystals of narcotine are strewn upon it and saturated with alcohol or ether.

*c.* Reagent XXI. has no effect on narcotine.

*d.* Reagent XIII. when dropped upon narcotine is colored yellow, and this does not change to red until the mixture has stood a month, provided heat be avoided; the slightest application of heat, however, will cause the color to change to red at once, as will also a trace of reagent XV.

*e.* Solutions of narcotine in dilute sulphuric acid turn purplish brown when evaporated on a water bath.

*f.* Narcotine dissolves in reagent XV. with a yellow color, which changes to red in the course of an hour.

*g.* If 20 milligms. of narcotine be rubbed together with 10 milligms. of sugar and 2 drops of reagent XIII., a pink color is produced, which, however, soon fades.

*h.* If narcotine be treated as described under morphine, in experiment *g*, using bismuth nitrate instead of ammonium molybdate, the mixture will turn red. If molybdic acid be used, it will become at first green and then blue; if tungstic acid be used, no color is produced.

*i.* If narcotine be treated as described under morphine, in experiment *i*, no blue precipitate will be produced, nor will narcotine decompose potassium iodide, liberating iodine as morphine does, unless indeed heat be applied or the mixture be allowed to stand for a day.

*j.* Water does not take up enough narcotine to produce a cloudiness with reagent IV., but aqueous narcotine solutions will become cloudy when treated with reagents V. or VII.—Pharm. Review, 1892, 48.

*Opium and Alkaloids—Administration.*—Abatkoff points out that both

opium and its alkaloids retard the digestion by diminishing the secretion of free hydrochloric acid, and that it therefore would be best to administer these remedies several hours after meals.—Pharm. Centralh., 1892, 249, from Corresp.-Bl. Schweiz. Aerzte.

*Opium and Morphine—Action on the Intestines.*—W. Spitzer has carried on a series of experiments in order to determine whether opium is better than morphine as an anti-diarrhœic and anodyne. He arrives at the conclusion that in diarrhœa, opium by the mouth is more powerful than opium extract or morphine subcutaneously, or morphine by the mouth. In slight intestinal pain, opium by the mouth is the best treatment, as we get the desired analgesia with small doses and without constitutional effect, the local action on the bowel being probably sufficient; in very severe pain, hypodermic injection of morphine is most effectual—Journ. Chem. Soc., July 1891, 852, from Virchow's Archiv., cxxiii., 593–628.

*Injection of Opium—Hypodermatically.*—E. Bombelon seriously proposes to inject a meconate of all opium alkaloids, contending that the physician would be much more satisfied with the effect than that from any single alkaloid. The injection is to be of such a strength that one-tenth syringeful (0.1) represents 0.01 gm. of opium.—Pharm. Zeitg., 1891, 522.

*Opium—Assay.*—H. Beckurts has reviewed the different processes for the assay of opium, and comes to the general result that all processes which depend on the property of morphine to separate iodine from iodic acid are of value only for preliminary examination; while of the processes which depend on the separation of morphine itself, only those are of value which use water or thin milk of lime as solvents; other solvents, as, for instance, diluted acid or alcohol, are either indifferent or injurious. The author especially recommends two processes: Dieterich's shortened process (see Proceedings 1891, xxxix, 434) and Hager's lime method modified by Beckurts.

——— *Hager-Beckurts.*—Macerate 8 gm. of powdered opium for half an hour with 77 c.c. of water in a well-stoppered flask, add 3 gm. of freshly slaked lime (from marble), and after frequently shaking during one hour filter off 51.5 c.c. (5 gm. opium). Pour upon it, so as to form a layer, 30 c.c. of a mixture of 1 volume alcohol and 5 volumes ether, which mixture has been saturated with opium, then add 6 c.c. of a saturated solution of ammonium chloride and shake vigorously. After six to eight hours, pour off the ether-alcohol on to a filter, moisten with ether, shake the mixture again with 10 c.c. of ether-alcohol, transfer the ethereal liquid to the filter, and, after it has passed through, pour on the filter the aqueous liquid, together with the separated morphine. The morphine is next washed with a morphine-saturated mixture of equal parts of ether-alcohol and water, then it is dissolved in boiling 90 per cent. alcohol, and filtered from the

insoluble calcium meconate. To the filtrate add 25 c.c. of decinormal hydrochloric acid, and titrate the excess of the acid with centinormal soda, using cochineal as indicator. 1 c.c. of decinormal hydrochloric acid indicates 0.0303 gm. of morphine; this, multiplied by 20, gives the percentage of morphine.—Apoth.-Zeitg., 1891, 526.

——— Alfred Dohme has compared Dieterich's method of assay with that of the U. S. Ph., and draws the conclusions that the U. S. Ph. method at any rate gives results which agree with each other, whatever they may do with the real percentage, so that reliance can be placed upon them; while Dieterich's method gives results that vary so greatly from one another that hardly any reliance can be put in them. That using the entire extracting fluid instead of an aliquot part does not improve the yield of morphine (see experiments 8, 9 and 10); but that a longer and hence more intimate and complete contact of the water with the opium does improve the yield (see experiments 12, 13 and 14). In support of the correctness of his deductions the author appends his experiments:

A large supply of Smyrna opium (opium A) was dried at 100° C. for eight hours, and after powdering very finely, again dried for five hours at 100° C. In a second series of experiments, the opium, also a Smyrna opium (opium B), was dried at 60° C. The method of Dieterich was used in both modifications, so that in the first series of experiments, the method as laid down in the German Pharmacopœia was used, while in the second series the modified and shortened method as last published by Dieterich (Helfenberger Annalen, 1890, 66–68) was adopted. The first three results by the U. S. P. process agreeing so well, it was thought unnecessary to obtain any more by that method.

The morphine obtained by either method is quite pure, but it appears to be more nearly colorless in case of the U. S. P. than in case of the Dieterich process. The following are the results obtained:

| Series I. (Opium A.) | U. S. P. Per Cent. | Dieterich. Per Cent. |
|---|---|---|
| 1 | 12.51 | 10.79 |
| 2 | 12.60 | 15.32 |
| 3 | 12.55 | 13.17 |
| 4 | —— | 12.75 |
| 5 | —— | 10.96 |
| 6 | —— | 11.46 |
| 7 | —— | 10.55 |
| 8 | —— | 10.20 |
| 9 | —— | 11.37 |
| 10 | —— | 10.86 |
| 11 | —— | 12.25 |
| 12 | —— | 13.60 |
| 13 | —— | 13.06 |
| 14 | —— | 12.28 |
| 15 | —— | 12.05 |
| 16 | —— | 12.38 |

| Series II. (Opium B.) | U. S. P. Per Cent. | Dieterich. Per Cent. |
|---|---|---|
| 1 | 12.87 | 13.17 |
| 2 | 13.30 | 13.78 |
| 3 | 13.16 | 12.49 |
| 4 | 13.48 | 15.25 |

In experiments 8, 9, and 10 by Dieterich's method, the entire fluid was taken instead of an aliquot part, and proportionately more ether and ammonia was added. In experiments 11 and 15 the usual method was used, but the opium was allowed to stand in contact with the water for twenty-four hours, instead of one, as required by the method.

In experiments 12, 13 and 14, the entire fluid was taken instead of an aliquot part, and it was also allowed to stand twenty-four hours in contact with the opium before filtering.—Am. Journ. Pharm., 1891, 439–441.

——— Dieterich modifies one of the details of his morphiometric method as follows: "Based upon later observations, we find it necessary to add the following: *Not every opium powder* used for assaying yields after maceration sufficient filtrate for using, therefrom, 42 gm., and it may happen that only 38 to 39 gm. are obtained by spontaneous dropping. In such a case, the residue upon the filter is to be moderately pressed with a thick glass rod, whereby the deficient amount of liquid will be caused to drop off."—Am. Journ. Pharm., 1891, 441, from Helfenberger Annalen, 1890, 76.

——— Charles Rice suggests some improvements in the assay of opium, as ordinarily conducted, so as to eliminate at least some of the errors inherent to the different methods hitherto proposed.

The various methods may be divided into two principal groups: 1. That in which a given sample of opium is completely exhausted of all its soluble matter, after which this solution is concentrated, and the morphine contained therein determined in one way or another. 2. That in which opium, in presence of an alkali or an alkaline earth, is treated with a definite quantity of water until the latter has taken up as much as possible of the soluble matter, after which a certain portion of the solution, assumed to represent a corresponding fraction of the weight of opium, is measured or weighed off, the morphine determined in it, and the percentage calculated from the quantity found in this fraction.

The first method requires some time and care, and for that reason has not met with general favor, although it avoids at least one error which is inherent in the second method, which is the assumption that an aliquot part (weight or measure) of the opium "solution" always represents a definite fraction of the amount of opium taken. The U. S. P. method does not take in account the increase in volume which the dissolved portion of opium must cause; and Dieterich's method, although in so far an improvement that it directs both the water and the filtrate to be weighed, starts from the assumption that opium always yields 60 per cent. of its weight to water, which assumption, of course, is fallacious. Rice suggests a simple remedy, which is to determine in a small portion of the opium "solution" the amount of extractive matter dissolved, and in a larger portion of the same "solution" the morphine. Of course, the water added at first, as

well as the fractions, must be weighed. In order to show the application of this improvement, the author takes the officinal assay process:

| | |
|---|---|
| Opium, in any condition to be valued | 7 gm. |
| Lime, freshly slaked (and in apparently dry powder) | 3 " |
| Ammonium chloride | 3 " |
| Alcohol, | |
| Stronger ether, | |
| Distilled water | each a sufficient quantity. |

Triturate the opium [previously dried at a temperature not exceeding 85° C. (185° F.), and reduced to powder], lime, and 20 gm. of distilled water until a uniform mixture results; then add 50 gm. more of water, and stir occasionally during *one* hour [half an hour is not long enough], taking care that no loss of water be incurred through evaporation. [A good plan is to set the small mortar containing the mixture into a dish containing water, and to cover it with a beaker]. Filter the mixture through a plaited filter, 3 to 3½ inches in diameter, into a graduated cylinder [keeping the funnel covered with a plate of glass, or beaker, to prevent evaporation.]

Transfer 5 gm. of the filtrate into a tared beaker containing some sand and a glass rod, and evaporate it to complete dryness, occasionally stirring at 100° C. [This requires only an hour or two, and is completed before the other part of the filtrate can be put through its last operation.] Note the increase of weight [which may be designated by $r$ (meaning "residue")].

Also transfer about 50 c.c. of the remaining filtrate into a tared Erlenmeyer flask having the capacity of about 120 c.c., and carefully weigh it so as to obtain the exact weight of the filtrate transferred to it (which weight may be designated by $S$). Add to it 5 c.c. of alcohol and 25 c.c. of stronger ether, and shake the mixture; then add the chloride of ammonium, shake well and frequently during half an hour, and set it aside, well stoppered, for twelve hours. Finally filter as directed by the U. S. Pharmacopœia, wash the morphine, and dry it at 100° C. (the weight of morphine may be designated by $m$).

The percentage of dry morphine in the opium assayed will then be found by the following rule:

Multiply the weight ($m$) of the morphine thus obtained by 5000, and divide the product by the weight ($S$) of the solution used for the morphine determination, multiplied by the difference between 5 and the dry residue ($r$) obtained from 5 gm. of the solution.

Or, using the letters above inserted, and designating by $x$ the percentage of dry morphine in the opium, the following formula will give the desired result:

$$x = \frac{5000m}{S(5-r)}$$

The author gives now the rationale of his formula, for which reference

must be had to the original article. He furthermore states that the quantity of lime which the 5 gm. of opium "solution" evaporated to dryness contains is so minute that it does not need to be considered at all in the calculation. As to the claim that the "fractional" method of assaying opium never yields as high results as the first group of processes, Rice says that it is mainly due to the fact that during the period of maceration the opium is kept in contact with a partly saturated solution, which will greatly retards the osmosis of the dense solution of extractive from the interior of the minute particles of opium.—Am. Drug., 1892, 100–102.

*Opium Assay.*—D. B. Dott suggests the following method as giving more satisfactory results. One hundred grains of powdered opium are exhausted with proof spirit (0.920). To the tincture add a few drops of ammonium oxalate, and then ammonia until the tincture is very slightly acid. Concentrate to one-third its volume, allow to cool, filter, concentrate to about one fluid drachm, transfer to a small flask, 30 minims of spirit and 30 minims of water being used to wash the capsule. Add now 25 minims of ammonia and 1 fluid ounce of ether, cork well and shake; set aside for eighteen hours. Decant the ether, filter the remainder through counterpoised paper filters, wash with "morphiated" water, dry in water-bath, wash with benzol, dry, weigh, and titrate with decinormal acid of which one grain-measure indicates 0.0303 grains of crystallized morphine.—Chem. Drug., February 1892, 296.

*Papaveraceæ Alkaloids.*—Sanguinarine has been found to consist of *four* alkaloids: *chelerythrine*, *sanguinarine* (apparently identical with one of the alkaloids of Stylophoron diphyllum and of Macleya cordata), *β-homochelidonine* (yielding colorless salts), and *protopine* (yielding colorless salts); the latter is very probably identical with *macleyine*, and one of the alkaloids from Eschscholtzia californica (see Am. Jour. Pharm., 1891, p. 457).—Ernst Schmidt, Apotheker Ztg., 1891, 522; Am. Jour. Pharm., 1891, 539.

*Alkaloids of the Roots of Sanguinaria canadensis and Chelidonium majus.**—By G. König. The roots of *Sanguinaria canadensis*, a native of North America, and the sanguinarine of commerce contain several alkaloids, including *chelerythrine*, which is present in greatest quantity, *sanguinarine*, *γ-homochelidonine* and *protopine*.

*Chelerythrine* crystallizes with a molecule of alcohol, which is not separated at a temperature of 150°; the formula is $C_{21}H_{17}NO_4 + C_2H_6O$; melting point 203°. It is identical with the alkaloid which the author separated from the celandine, *Chelidonium majus*. The *aurochloride*, $C_{21}H_{17}NO_4,HAuCl_4$, melts at 233°; the *platinochloride* is $(C_{21}H_{17}NO_4)_2,H_2PtCl_6$; the *hydrochloride* crystallizes out of aqueous solution with 5

*Chem. Centr., 1891, i., 321–322; Zeit. Naturwiss. Halle, 63, 369–426; reprinted from Jour. Chem. Soc., 1891, p. 843.

mols. $H_2O$, and from alcohol with 4 mols. $H_2O$. The salts are lemon-yellow.

*Sanguinarine*, $C_{20}H_{15}NO_4$, is very similar to chelerythrine in its properties; it crystallizes with ½ mol. $H_2O$, and melts at 211°; its salts are red. The *hydrochloride*, $C_{20}H_{15}NO_4,HCl + 5H_2O$, the *nitrate*, $C_{20}H_{15}NO_4,HNO_3 + H_2O$, the *aurochloride*, $C_{20}H_{15}NO_4,HAuCl_4$, and the *platinochloride*, $(C_{20}H_{15}NO_4)_2,H_2PtCl_6$, were prepared.

The base which the author has named *γ-homochelidonine* is probably identical with that separated by Selle from *Chelidonium majus*, and its formula is probably $C_{22}H_{21}NO_4$. Its behavior with alkaloid reagents resembles that of Selle's γ-homochelidonine. The fourth alkaloid, *protopine*, was prepared from *Chelidonium majus, Sanguinaria canadensis*, and from opium, all the three specimens being identical. Its formula is $C_{20}H_{17}NO_5$, and it melts at 204°; the *platinochloride*, $(C_{20}H_{10}NO_5)_2,H_2PtCl_6 + 3H_2O$; and the *aurochloride*, $C_{20}H_{17}NO_5,HAuCl_4$, melting at 182°, were prepared; the *hydrochloride*, $C_{20}H_{16}NO_5,HCl$, crystallizes in two different forms, and appears to be free from combined water.—Am. Jour. Pharm., 1891, 457.

### PASSIFLOREÆ.

*Carpaine in North American Papaya Leaves.*—It is well known that plants grown under different conditions may differ very essentially in some of their constituents. Dr. Greshoff discovered that the young leaves contained an alkaloid which he called carpaïne. Mr. J. B. Nagelvoort was prompted to submit Carica Papaya grown in Detroit to an analysis. He found them to contain 0.25 per cent. carpaïne, calculated on the dry material.—Am. Jour. Pharm., 1891, 437.

### PEDALINEÆ.

*Oil of Sesame—A New Principle Obtained From.*—By T. F. Focher. (Chem. Zeitung, t. xix., 1890; Chem. Rep., after Monit. Scientif., Oct. 1891.) —Jour. Pharm. Chim., 1892, 70, 71.

### PHYTOLACCACEÆ.

*Phytolacca acinosa.*—By Dr. Kashimura. (Archiv d. Pharm., 29 Bd., Heft. 3, 1891.) The author thinks that the active constituent is a resin. By distillation he obtained an oil resembling phenol.—Pharm. Post, 1891, 583, 584.

### PITTOSPOREÆ.

*Bursaria spinosa*, Cav., known in Australia as the native box, has a fragrant wood.—Chem. Drug., Aug. 1891, 221.

### POLEMONIACEÆ.

*Phlox subulata*, Linné.—Lee Steinan examined the overground portion

of this plant and found it to contain neither an alkaloid nor a glucoside. He obtained a volatile oil, fat, resin, 16.76 per cent. of ash, and a crystalline principle identical with the hydrocarbon found in Phlox Carolina.—Am. Jour. Pharm., 1892, 121.

## POLYGALACEÆ.

*Genus Polygala in North America.*—By Wm. E. Wheelock. Memoirs of the Torrey Bot. Club, Vol. II., 4, Dec., 1891. A contribution to the geographical distribution, as well as a monograph of the species of Polygala.

*The Non-appearance in Trade of the Root of Polygala alba with that of P. Senega.*—By Prof. J. U. Lloyd, of Cincinnati. (Pharm. Rundschau, 1892, Bd. x., 51–53.) The author revives the question again concerning true Senega and other species of Polygala or so-called "senegas." The object of the paper seems to be to wipe out in the text-books upon "Materia Medica" any reference to Polygala alba as an accidental or intentional admixture of, or for being mistaken for senega, owing to the scarcity of the former.

The author refers to his previous work in conjunction with his brother and is confirmed in their results as given in Proc. A. P. A. (Vol. 29, p. 453) and Pharm. Rundschau (1889, Bd. 6, p. 86). Also that in the following States the root of P. Senega is very scarce: Pennsylvania, Kentucky, Ohio, Illinois, Missouri and Kansas northwards to Iowa, Nebraska, Wisconsin, Minnesota and Dakota, and has recently gone over to the Northwest provinces from Canada (Manitoba, Saskatchewan, etc.). These large territories are but little cultivated, and the rich soil develops the variety latifolia. Canada still supplies us with the largest amount of senega. The wholesale dealers receive the root, via St. Paul and Minneapolis, under the name of "Minnesota," "Manitoba" or "Western Senega." At the present time the European markets receive the greatest part of the root—they are also particularly careful as regards the care used in the preparation of the root.

The characteristic properties of senega are such that occasionally, due to ignorance or negligence only however, the collector might allow some false roots to be admixed. But practical adulteration is not done, as the druggist and dealer will not allow any sophisticated root to enter their respective houses, as it is easily discerned. The supposed substitution or adulterations believed to have been observed by Wm. Saunders, J. M. Maisch, Thos. Greenish and E. M. Holmes were shown to be unimportant and incorrect. This was established as a white senega, which was supposed to be mixed with the root of Polygala Boykinii, Nuttall, by J. U. Lloyd and Carl Mohr. This obviously applies likewise to a senega root received by a New York drug firm from Kansas, which Prof. Maisch supposed to be derived from P. alba.

Prof. Lloyd states that P. alba and P. Boykinii are botanical varieties, and so must be shut from the possibility of coming into the market; that for two years he has endeavored through the learned botanists of the senega producing states, of the Agricultural Department at Washington, of the State Universities, and State Agricultural Stations, to obtain a typical specimen of P. alba, and could not obtain a living plant. He gives brief mention of the more important information secured by him in the fall of 1891.

He has not found a single botanist who has seen or heard of a living plant of P. alba. And very few, if any, of those owning dried specimens had ever seen a living plant. He quotes Prof. Tracy as saying that he has never seen P. alba and P. Senega growing in the same locality. And that of the former, even in its most luxuriant home, one could not gather more than one half pound of the root in a day. Prof. Lloyd then quotes from his correspondents who have been unable to report any or not more than one or two specimens in their collections. Mr. Holzinger, of New Haven, during his travels in North Dakota, in the summer of 1891, found P. alba growing in large quantities, but the plant was never higher than 5 or 7 inches, possessed a very small root, and was never collected.

Prof. Lloyd comes to the conclusion that the occurrence of P. alba, north of the senega root producing territories, is very limited and occurs only in isolated spots in the dry table lands in Arizona, New Mexico and Mexico. Of the large amount of Canada senega he has seen the past year, he has strictly observed that not a single root comes from any other species than the P. Senega and its varieties.

In closing this report of the above examination of the senega root, he comes to the conclusion that all of the root comes from the States of Wisconsin and Minnesota; while the larger amount coming from Canada is the P. Senega and viz., the P. Senega var. latifolia (Torr. and Gray). The determination of the size and color of the root depends upon the climate, soil, age and time of collection as well as treatment of the root. The roots of P. alba and P. Boykinii are neither accidentally nor purposely used as an adulteration of P. Senega nor are they mistaken for the real root, and therefore in works and text-books on Pharmacognosy should not be considered.

*Polygala alba.*—By John M. Maisch.—Am. Jour. Pharm., 1892, 177–182.

Prof. Maisch replies to Prof. Lloyd's article in Pharm. Rundschau (1892, Bd. x., 51–53). He calls attention to an article of his which appeared in the Am. Jour. Pharm., 1889 (Sept.) in which he gave a history of the origin of a false senega root which proved to be Polygala alba, Nuttall. Prof. Lloyd supposing this false senega to be identical with the senega collected in Wisconsin and contiguous States from a supposed variety of *Polygala Senega*, intermediate between the typical form and the variety

*latifolia*, reported his views to the American Pharmaceutical Association in 1881, and exhibited numerous specimens of the root of this supposed variety, all of which were at once declared to differ very essentially in all physical properties from those of the false or white senega, by those who had paid some attention to the latter drug (see Proceedings A. P. A., 1881, p. 522). In a paper published by Prof. Lloyd in the Pharmaceutische Rundschau, 1889, it is stated, p. 88, that he has met with bales of southern senega root of excellent quality, but entirely destitute of the keel. Not having seen this root, it was impossible for the author to speak with certainty of its identity with that of white senega; but as figured in the paper quoted (loc. cit., p. 87) it certainly strongly resembled the latter. Recently another paper by Professor Lloyd was published in the Pharmaceutische Rundschau, March, 1892, in which it is stated that the "supposed substitution or adulteration, believed to have been observed by Wm. Saunders (1876), J. M. Maisch (1877), etc., were shown to be unimportant or incorrect (unwesentlich oder unzutreffend,") and that this "obviously applies likewise to a senega root received by a New York drug firm, from Kansas, which Prof. Maisch supposed to be derived from *Polygala alba*."

Regarding the first part of this quotation, Prof. Maisch says: I may be permitted to reiterate once more what I have repeatedly stated before, that I have never asserted senega root to have been *adulterated* with white senega, since I have seen the latter on the market *only as a substitute* for the former; but, on the other hand, I have not denied the *possibility* of such intentional adulteration. While recognizing the medicinal utility of white senega root, I do not regard it as equal to that of the officinal senega, and for this reason cannot agree that such substitution is unimportant. Ever since I have first known this white senega root, in 1876, I have held it to be procured from a species differing botanically from *Polygala Senega*, and while I was at one time mistaken as to the identity of the parent plant of white senega, every doubt has, in my opinion, been removed in 1889. Professor Lloyd's assertion of incorrectness in this respect has certainly not been proven by him. *Obviously* this applies in like manner to the second part of the quotation. It is, however, perfectly correct that there was a time when I *supposed* the white senega to be derived from *Polygala alba;* but when this supposition, based upon the characters of a botanical specimen—root with flowering stems—was verified by the verdict of the botanists mentioned in my former (1889) and the present paper, all of whom had either seen the root or were informed of its dimensions, it would have been more than presumptuous on my part to doubt the identity of the plant.

The main object of Prof. Lloyd's paper is to prove the great scarcity (?) of *Polygala alba*, which he maintains cannot be taken into consideration, either as an accidental or intentional admixture of, or for being mistaken for, senega, and that reference to it in text-books on pharmacognosy should

be omitted, as not supported by facts ("gegenstandslos"). To these conclusions I most decidedly object as not being warranted by the facts. As to Professor Lloyd's aim to prove that the roots of the two species of *Polygala* cannot be profitably *collected in the same localities*, that point is conceded without reserve; for as far as I am acquainted with the literature on *P. alba*, its true home is farther west and south-west than that of *P. Senega;* and because the former species, as far as known, does not grow in Iowa, Minnesota and Manitoba, efforts made by him to obtain specimens from these localities were, naturally, doomed to be unsuccessful. The root of *P. alba* has thus far come into the market only from southwestern Missouri and from Kansas, and, notwithstanding my ill success in former years, living plants could, probably, have been procured more readily in the localities named. When Prof. Lloyd states (*loc. cit.*, p. 52) that he had not found a botanist who had ever met with the living plant, the statement is doubtless intended to refer only to those States in which the true senega is collected for commercial purposes, since Prof. S. M. Tracy, of Mississippi, is quoted as having observed *P. alba* and *P. Senega* never to grow in the same localities, and the former to be scarce even in its most luxurious stations in that State.

Among the botanists corresponded with is also Prof. Thos. Meehan, of Philadelphia, who, it is stated (*loc. cit.*), "being in frequent interchange with botanists and collectors of plants in the different States, endeavored to procure specimens and information concerning the habitat of *P. alba*, but entirely without success." Now, Mr. Meehan is one of the most active members of the Academy of Natural Sciences, and of its Botanical Section, and is very thoroughly acquainted with the Academy's herbarium, which contains many specimens of the species named, from a number of different localities; it appeared to me that his inquiries could scarcely have been directed to the home of the plant west of the Mississippi River; and upon inquiry as to the correctness of this supposition he kindly replied as follows: "The statement you quote makes the fact of my not getting the specimens seem more strongly negative than the real facts would warrant. I gave my herbarium away several years ago, as that of the Academy of Natural Sciences is convenient, and I am not, therefore, in frequent interchange with botanists; and in regard to this particular case—not knowing that it was a matter of so much importance, I did not make the great effort that the remarks would seem to indicate. I had a note from Prof. Cope simply asking if I could get specimens of the plant. I sent to two of my best friends in Alabama and Tennessee, and they reported that it was extremely rare, and that they could not get it; but I did not write to friends on the other side of the Mississippi. If I had been asked to make the extra exertion to procure specimens, I would have spent much more time than I thought necessary when the application was made to me."

That Mr. C. G. Lloyd, in exchanging with others, has never been offered

P. alba, is not an argument in favor of either the rarity or the frequency of the plant; nor is the fact that Prof. Lloyd's correspondence resulted in obtaining specimens from six localities in Mexico, Texas, Kansas, North Dakota, and from California, the latter stated to have been procured from the U. S. Agricultural Department. Among the Polypetalæ of the "Flora of California," by W. H. Brewer and Sereno Watson, the species is not mentioned. On this and some other points it was to be presumed that reliable information could be had from the U. S. Department of Agriculture; and in reply to my inquiries, Dr. Geo. Vasey, the accomplished botanist of the Department, furnished the following:

1. The National Herbarium contains many specimens of *Polygala alba*.

2. The root seldom attains 5 mm. in diameter, but often grows 30 cm. long. In young plants the root is much slenderer.

3. The plant is known to occur in Louisiana, Texas, New Mexico, Arizona, Arkansas, Kansas, Nebraska and Dakota. The California locality is probably a mistake.

4. It is abundant in many places in the Great Plains, from New Mexico northward to Dakota.

It is not stated in Prof. Lloyd's paper whether his specimens were accompanied by roots; but it is mentioned that all these *plants* were much smaller than the Pol. Senega gathered in Kentucky, and that the North Dakota plants grow only to the height of 5 to 7 inches, and have only small roots. Heretofore I have quoted from the floras of the Northern United States, the Southern United States, and the Rocky Mountain Region, showing that the plant attains a height of 12 inches. Still, as the height of the stem is no indication of the dimensions of the root, the information kindly given by Dr. Vasey applies more directly to the question at issue. In my paper of Sept., 1889, I give the diameter of the root for the portion beneath the head, *i. e.*, immediately beneath the stem remnants, while Dr. Vasey's measurement, as given above, obviously applies to the body of the root. Comparing the measurements we have:

Length of root: 30 cm. *(Dr. V.)*; 4 to 6 inches = 10–15 cm. *(M.)*

Diameter: 5 mm. *(Dr. V.)*; ¼ inch = 6 mm., few roots (in the commercial article) ⅛ inch = 3 mm., some ⅜ inch = 9 mm., rarely ½ inch = 12 mm. (*M.*). These figures speak for themselves.

Referring to the fact that *P. alba* does either not grow, or is very scarce, in the districts where senega is collected, Prof. Lloyd suggests that "possibly it is more frequent in the arid plains of Arizona, New Mexico, and in Mexico, but from all appearances even there only in limited tracts." This suggestion is corrected by Dr. Vasey's answer; and as a supplement to it may be quoted Prof. J. M. Coulter's Manual of the Plants of Western Texas, where *Pol. alba* is reported to grow in "sandy soil throughout Texas; apparently the most common Polygala."

While in my opinion the facts presented above fully sustain my position

in regard to the origin of white or false senega, additional and I think even stronger evidence of its origin from a species differing from *Pol. Senega*, is to be found in the structure of the two roots, as I pointed out in 1877, described briefly in 1881, and illustrated in the National Dispensatory, and in my Manual of Organic Materia Medica by sketches drawn from sections of the two roots. These differences may be briefly summed up as follows: The root of *Pol. alba* shows upon transverse section a circular wood surrounded by a bark of uniform thickness, the thin layer of the inner bark being likewise of uniform width or, in very young roots, absent, because not yet developed. The structure of the root of *Pol. Boykinii* agrees with this description. On the other hand, the transverse section of the root of *P. Senega* always shows a more or less irregular wood, and an irregular development of the inner bark, no two sections of the same root being exactly alike; even in those thick roots in which the meditullium shows apparently a circular growth, it is easily observed, on closer examination, to be of irregular development, most strikingly so in the thinner branches. In other words, in old senega roots grown in rich soil, the irregularity of its structure may become obscured to some extent, but it does not entirely disappear, while no essential change is observed in the uniform structure of the young and old roots of *P. alba*.

The conditions pointed out were again observed in a specimen of "northern senega" described by Prof. Sayre in Amer. Jour. Phar., March, 1892, p. 113, and kindly supplied by him. Of the 15 roots of which the sample consisted, seven roots were quite small and immature, weighing together only 3 gm. (46 grains); they are pale colored and show the keel very plainly in all parts. In the remaining eight dark-colored roots, some of the thinner portions and of the branches were missing. Four of these roots, weighing 10.4 gm. (160 grains), likewise showed the keel, though less prominently in their upper parts. In two roots, weighing 8.7 gm. (134 grains), mere indications of the keel could be observed in the root body, but the branches showed it distinctly. The remaining two roots, or rather parts of roots, weighed 13.94 gm. (215 grains); the external indications of the keel were quite doubtful, and could not be distinguished from the longitudinal wrinkles of the root due to the shrinkage of the tissues by drying. The internal structure, however, gave abundant evidence of identity with that of the smaller roots. These roots having been collected in the same locality furnish proof that the external restriction and apparent disappearance of the keel can occur only in old senega roots of robust growth. Analogous conditions have never been recorded in the case of keelless white senega, which consists of the naturally thinner roots of *Polygala alba*.

*Polygala alba*, Nutt., *as a Source of Spurious Senega.*—By Dr. H. H. Rusby, Bull. of Pharm., 1892, 163–166. Dr. Rusby reviews the history of the Senega question, and replies to Prof. Lloyd's paper in the Pharm.

Rundschau (March 1892). Prof. Lloyd claims that difference in climate and topography can cause a root, which elsewhere habitually grows with an incomplete woody zone, and presents in dried specimens a most conspicuous keel, to grow with a complete woody zone and to be lacking in the keel. The statement thus nakedly put requires no refutation. In the entire record of anatomical literature there can be found no support for the claim. Dr. Rusby agrees that the roots of *P. alba* are smaller than the large forms of senega. He says that quite a number of specimens which he examined grew with roots as large (or larger than) an average root of *P. Senega*. And that besides these stumps he has seen a few good-sized roots. Messrs. Peek and Velsor were offered a lot of senega, the genuineness of which they suspected. They expressed their doubts to the dealer offering it. He asked the collector for specimens of the entire plant, which were furnished direct and submitted independently to the leading botanists of the country, who were unanimous in their verdict that it was *P. alba*.

Mr. Canby writes, that although in the places where he encountered it, in extreme northwestern Dakota, there was not much of it, yet it is a very widely distributed species, ranging down to San Luis Potosi, etc., in Mexico, and east to the Mississippi. Mr. Frank Tweedy, of the United States Geological Survey, writes that he has collected *P. alba* in Texas and Montana, and *P. Senega* in New York and Maryland, and so far as his experience goes, the *P. alba* is the more abundant. Dr. J. H. Oyster, while collecting it in Kansas and Texas, thought that it might be collected as a substitute for senega, as he noticed that it was quite common. Dr. Wm. E. Wheelock, in his remarkably accurate and complete monograph on North American species of Polygala, devotes nearly a page to enumerating the collections of this plant, which he has personally examined, coming from Louisiana, Arkansas, Missouri, Texas, New Mexico, Kansas, Nebraska, Dakota, Arizona and Washington.

Dr. Rusby does not claim that the root of *P. alba* occurs in the market as a spurious senega, as he has never personally investigated that question, but he does claim that the conditions are favorable to such an occurrence.

Lest the claim might subsequently be put forth that after all *P. alba* is not specially distinct from *P. Senega*, Dr. Rusby contrasts their strong and constant, though minute differential characters:

| *P. Senega.* | *P. alba.* |
|---|---|
| Leaves.—Apex much produced; very frequently small, scale-like, crowded ones at the base. | Leaves.—Apex merely acute. |
| Spikes.—Cylindrical, obtuse or rounded at the top, or at least not tapering. | Spikes.—Denser, conical to lanceolate, or often at length much elongated, the apex strongly tapering and acute. |

| *P. Senega.* | *P. alba.* |
| --- | --- |
| Flower.—Style not appendaged, or the tuft of hairs minute. | Flower.—Style auriculate above the middle and above the pedicelled stigmatic gland, terminating above in a filiform, minutely tufted appendage. |
| Capsule.—Nearly orbicular, compressed. | Capsule.—Ovoid. |
| Seed.—Curved, only moderately hairy, caruncular lobes, nearly as long as the seed. | Seed.—Hardly curved, covered with appressed silky hairs. Caruncular lobes about half as long as the seed. |

In the above characters, assigned by Dr. Wheelock, especial value attaches to the shape of the spikes, and the form and size of the caruncle, these characters being particularly constant among the Polygalaceæ.

*Northern Senega.*—Prof. Dyche on his return from a tour in the Northwest, brought with him a root which is collected in large quantities, and seems to be one of the staples of that country. Prof. Sayre finds it to be undoubtedly a good sample of senega. In length it varies from 4 to 8 inches; in diameter from $\frac{1}{8}$ to ½ inch. Surrounding the root is a dark scar-covered head, having a diameter of from ¼ to ½ inch. This head in the case of younger roots is covered with immature pinkish leaf-covered stems. The characteristic keel of Southern senega is rarely present, and the contour of the root is much less contorted. The color ranges from the light yellow of young roots to the dark brown of the older ones.

Near the head, prominent annulations are present. These continue with enlarging intervals of space for some distance down the root. Lengthwise the whole root is deeply wrinkled, while frequent warty enlargements occur. The branches are not numerous. In considerable quantities, the odor of gaultheria is quite prominent, as it is also in a cold aqueous infusion. The taste is very acrid.

Under the microscope the wood is found to be cylindrical, and the ingrowth of the inner bark on one side which produces the keel of the Southern variety is not apparent in a majority of cases. The wood is whitish, ligneous, and occupies about ⅓ of the diameter of the root.

Mr. Clung found 3.5 per cent. polygalic acid and found methyl-salicylate in abundance.—Am. Jour. Pharm., 1892, 113–115.

## POLYGONACEÆ.

*Polygonum Bistorta.*—Paul Krebs determined the following constituents in bistort root: Tannin 15.00 per cent., fat and wax 0.10 per cent., resin 0.30 per cent., mucilage 1.32 per cent., dextrin 1.92 per cent., glucose 4.88 per cent., albuminoids 1.78 per cent., and insoluble matter consisting of incrusting substances, lignin and cellulose, 47.06 per cent. There were also found moisture 9.20 and ash 4.80 per cent. Caoutchouc, gallic acid, coloring matter and starch were detected, but not estimated. Bowman in 1869 found 20 per cent. of tannin, and other investigators have reported

the presence of tannin, gallic acid, starch and mucilage.—Am. Jour. Pharm., 1891, 476, 477.

*Rhubarb—Presence of Fixed Oil.*—B. S. Proctor calls attention to the custom which obtains with many drug-millers of adding a small percentage of a fixed oil to the rhubarb to be powdered, originally with a view of facilitating the powdering and preventing loss by dust, but also because it improves the color. He advises to exhaust the powdered rhubarb with chloroform, evaporate in a tared dish, and weigh the residual yellow fat; it will be necessary, however, to deduct about 0.2 per cent. from the result obtained from 100 grains of rhubarb, because, according to Dragendorff, rhubarb naturally contains 0.15 per cent. of fat and other matter soluble in chloroform. On examination he found commercial powder to contain from 0.4 to 2.2 per cent. of chloroform residue, and considers more than 0.5 per cent. suspicious. The presence of oil is also the reason why rhubarb and rhubarb with magnesia mix so difficultly with water.—Chem. Drug., April 1892, 585.

*Method of Utilizing Waste Chips and Dust of Rhubarb Root.*—By A. Bartholf, New York, U. S. A., Eng. Pat., 4555, March 13, 1891, 4d. The sound chips and sawings produced in the cutting of rhubarb root are ground or granulated, moistened, then treated with gum arabic or other suitable adhesive material, and the whole thoroughly mixed. The mass while still in a moist state is then pressed and moulded into the desired shape, or may be spread and rolled out into a sheet, and this, when dried, cut up. The product thus obtained is hardly to be distinguished from the ordinary solid root; the above treatment does not impair the medicinal qualities of the rhubarb in any way, and when thus prepared it will keep in any climate and is not subject to the ravages of insects.—Jour. Soc. Chem. Indus., 1891, 656.

*Chinese Rhubarb—Varieties of.*—By Adrian. (Jour. Pharm. Chim.) The author reports three varieties of Chinese rhubarb at present in the market: 1. Shensi; 2. Canton; 3. High dried.—Drug. Circ. and Chem. Gaz., 1891, 177.

*Rhubarb—Shensi, Shanghai and Canton Varieties.*—Characteristics are given from the price-list of Cæsar and Loretz, Halle.—Pharm. Centralh., 1891, 648, 649.

## PRIMULACEÆ.

*Anagallis arvensis*, used in Mexico instead of saponaria, has been found by Dr. Schneegans to contain two glucosides identical with those obtained from quillaia and senega.

The aqueous decoction is precipitated with neutral lead acetate; the precipitate, thoroughly washed with water containing lead acetate, is suspended in water and decomposed by dilute sulphuric acid, the excess of the acid neutralized by lead carbonate, the mixture filtered, the filtrate

evaporated to dryness, the residue dissolved in boiling absolute alcohol, four volumes of chloroform added, the precipitate removed and the filtrate mixed with ether until precipitation ceases; this precipitate, dried over sulphuric acid, corresponds with quillaic and polygalic acid. It is soluble in water, dilute alcohol and boiling absolute alcohol; the aqueous solution has an acid reaction, foams strongly, and reduces Fehling's solution after boiling with dilute acids; it has a sharp, acrid taste.

The filtrate from the lead acetate precipitate is precipitated with basic acetate of lead and the precipitate purified as above, avoiding, however, the use of chloroform: by repeatedly dissolving in hot alcohol and precipitating with ether, and drying over sulphuric acid, a yellowish powder was obtained, identical with sapotoxin and senegin. It is easily soluble in water, dilute alcohol, also in hot absolute alcohol; the aqueous solution is neutral, foams strongly, reduces Fehling's solution after boiling with acid, and gives a precipitate with basic lead acetate which is soluble in acetic acid (Journ. Pharm. von Els.-Lothr., 1891, 171).—Am. Jour. Pharm., July 1891, 348–349.

## RANUNCULACEÆ.

*Aconitum and Aconitine.*—E. Richards and Ashley Roger (Chem. and Druggist, 1891, 38, p. 205, 242) in examinations of Aconitum arrived at the following conclusions: (I) The best material for the preparation of aconitine is the tubers of Aconitum Napellus. (II) The alkaloid is found in the cambium, the vascular bundles and sieve ducts. (III) The crystals of aconitine represent hexagonal thin plates with acute ends. (IV) It is probable that two varieties, $\alpha$ and $\beta$, of aconitine exist. Melting point of $\alpha$-aconitine=182–184° C., $\beta$-aconitine 178–180° C.; the latter is also about six times as poisonous as the former. (V) Formula for aconitine is $C_{33}H_{43}N_2O_{12}$. (VI) Percentage of alkaloid in fresh tuber 0.71 per cent., dry 0.14 per cent., Japanese aconite, dry, 0.57 per cent.

The method for the preparation of aconitine recommended by the above authors is as follows: (*a*) The powdered tuber is macerated from three to four days with washed fusel oil, then percolated and the alkaloid extracted from the percolate with small quantities of dilute sulphuric acid. (*b*) The fusel oil is removed from this solution by treatment with ether, and the dissolved ether driven off by heat. (*c*) The alkaloid is precipitated from the acid solution by solution of sodium carbonate, collected on a strainer pressed between limestones, and then spread on bibulous paper and allowed to dry at ordinary temperature. (*d*) The dried alkaloid is then boiled with pure dry ether and the filtrate set aside to crystallize; the crystals are then redissolved in a small quantity of ether to remove a gum-like body. (*e*) The toxic properties of aconitine as thus obtained are rather great, but can be improved by conversion into the nitrate, and then from this obtaining the alkaloid.—Am. Jour. Pharm., July 1891, 338.

*The Alkaloids of True Aconitum Napellus.*—Prof. Dunstan and Mr. Umney have examined the alkaloidal constituents contained in the roots of the true Aconitum Napellus. The process used for the extraction of the alkaloids was such as to preclude the possibility of the occurrence of hydrolysis or other decomposition of the alkaloids.

The *alkaloid soluble in ether* was obtained as a gum-like mass incapable of crystallization. By conversion into hydrobromide it was separated into a crystallizable and an uncrystallizable salt.

The crystalline hydrobromide was identified as the salt of aconitine. The non-crystalline hydrobromide furnished an alkaloid resembling a gum in appearance. This is not aconine, or the base called by Wright and Luff picraconitine, which readily afforded crystalline salts. They propose to assign to it the name of *napelline*, which was first given to the alkaloid now known as pseudaconitine, and afterwards by Hübschmann to a substance which the work of Wright and Luff showed to be a mixture chiefly composed of aconine. The napelline obtained by Prof. Dunstan and Mr. Umney is probably associated with another amorphous base.

The *alkaloid soluble in chloroform* was proved to be identical with *aconine*, the amorphous base which results from the hydrolysis of aconitine.

The roots of the true Aconitum Napellus certainly contain three alkaloids, one of which is crystalline, viz.: aconitine; two being amorphous, viz.: napelline and aconine. Indications have been obtained of the presence of a fourth alkaloid which is amorphous and closely resembles napelline.—Am. Jour. Pharm., 1892, 207, 208; from Pharm. Jour. and Trans., 1892, 729.

*Aconine—Its Conversion into Aconitine.*—Dunstan and Passmore have investigated the subject of the hydrolysis of aconitine with especial reference to the formation of aconine. Wright and Luff state that the sole products of hydrolysis are aconine and benzoic acid. Dragendorff and Juergens state that the hydrolysis occurs in two stages; in the first there are formed benzoic acid and an alkaloid identical with the picraconitine of Wright and Luff; in the second the picraconitine is hydrolyzed into benzoic acid, methyl aconine. Dunstan and Passmore have carefully gone over the ground, but failed to obtain at any stage either picraconitine or methyl alcohol. The alkaloid obtained was a mixture of aconine and unaltered aconitine. With pure aconitine the reaction is in accordance with the equation $C_{33}H_{45}NO_{12}+H_2O=C_{26}H_{41}NO_{11}+C_7H_6O_2$.

*Aconine* cannot apparently be crystallized, but the authors succeeded in obtaining crystallizable salts, notably the hydrochloride, hydrobromate, sulphate and the nitrate. All these salts are soluble in water, the hydrochloride being least soluble. The base is best obtained from the pure hydrochloride by decomposition with a solution of silver sulphate, and decomposing the aconine sulphate with exactly sufficient baryta water. Aconine melts at 132° C. (corr.); it is very soluble in water, the solution

being alkaline; when dry it is insoluble in ether and almost so in chloroform. On analysis it afforded numbers agreeing with the formula $C_{26}H_{41}NO_{11}$. It is a powerful reducing agent, precipitating both gold and silver; it also reduces Fehling's solution. The salts of aconine are lævorotatory, whilst a solution of the base is dextro-rotatory $[\alpha]_D + 23°$. When heated with alkalies it slowly resinifies.

The study of the hydrolysis of aconitine has led to the conclusion that aconitine is *monobenzoyl aconine* ($C_{26}H_{40}(C_6H_5CO)NO_{11}$). In order to substantiate this inference experiments were made with a view of reversing the hydrolysis and reconverting aconine into aconitine. Since aconine is a comparatively strong base, it seemed likely that it might be able to decompose ethyl benzoate, with formation of aconitine or anhydro-aconitine if the temperature of reaction were high. Accordingly an alcoholic solution of aconine was heated in a closed tube for three hours at 130° C., with rather more than the calculated quantity of the alkyl salt. After removal of the unaltered ethyl benzoate, etc., a base in ether was isolated, the crystalline hydrobromide of which corresponded with the salt of anhydro-aconitine, and was identical with that obtained by the dehydration of aconitine.—Am. Journ. Pharm., 1892, 209, from Pharm. Journ. Trans., March 1892, 729.

*Aconite and Preparations—Assay.*—Apparently the best method would be to determine the quantity of crystallizable alkaloid, but in practice there is in the first place always the danger that the maximum yield of crystals may not be obtained, and hence that the activity of the preparation will be seriously under-estimated, and then very often the amount of substance available yields a quantity of total alkaloid far too small to render any method based on crystallization practically available. A. H. Allen proposes therefore to saponify the crystallizable alkaloids, which method gives a near approach to quantitative accuracy, as proven by C. R. Alder Wright. (See Proceedings 1878, xxvi., 597.)

$$\underset{\text{Aconitine.}}{C_{33}H_{45}NO_{12}} + \underset{\text{Soda.}}{NaHO} = \underset{\text{Aconine.}}{C_{26}H_{41}NO_{11}} + \underset{\text{Sodium benzoate.}}{NaC_7H_5O_2}$$

This method has the great merit of sharply distinguishing between the three principal poisonous aconite bases on the one hand, and the comparatively inactive products of their decomposition on the other. As it is generally accepted that aconine has only $\frac{1}{800}$ of the physiological activity of aconitine, and that japaconine and pseudaconine bear a similar relation to their respective parent alkaloids, it may be safely assumed that the activity of a mixture of aconite alkaloids is substantially represented by the proportion of saponifiable base present. The saponification method assumes that each equivalent of benzoic acid indicates an equivalent of crystalline aconitine. The author extracted the alkaloid by Farr and Wright's process, converted it into hydrochloride, and saponified it by boiling with

sodium hydrate. The benzoic acid (liberated by hydrochloric acid) was dissolved out with ether, and titrated with $\frac{1}{10}$ normal baryta water in the presence of phenolphthalein. For details of the necessary manipulations, the original article must be consulted. The following table shows the products of the saponification of the three principal saponifiable alkaloids of aconite. The number of atoms of hydrogen in the formulæ of aconitine and aconine has been increased in each case by two, in accordance with the recent researches of Dunstan and Ince:

| *Cryst. Alkaloid.* | | *Acid Saponification Product.* | | | | *Basic Saponif. Product.* | |
|---|---|---|---|---|---|---|---|
| Name. | Formula. | Name. | Formula. | Yield. | NaHO Required. | Name. | Formula. |
| Aconitine .... (A. Napell.). | $C_{33}H_{45}NO_{12}$ | Benzoic ac. | $C_7H_6O_2$ | 18.92 | 6.20 | Aconine. | $C_{26}H_{41}NO_{11}$ |
| Japaconitine.. (A. Fisch.) | $C_{66}H_{88}N_2O_{21}$ | Benzoic ac. | $C_7H_6O_2$ | 19.60 | 6.43 | Japaconine. | $C_{26}H_{41}NO_{10}$ |
| Pseudaconitine ........ (A. Ferox). | $C_{36}H_{49}NO_{12}$ | Veratric ac. | $C_9H_{10}O_4$ | 26.49 | 5.82 | Pseudaconine. | $C_{26}H_{41}NO_9$ |

—Pharm. Journ. Trans., Sept. 1891, 230–233.

J. C. Umney takes exception to the assumption that each equivalent of benzoic acid represents one equivalent of aconitine, because both Wright and Juergens state that Aconitum Napellus contains besides crystalline aconitine, a gummy base that yields on saponification a proportion of benzoic acid, which by the saponification method would be reckoned in terms of aconitine.

*Aconitine.*—A. H. Allen refutes the assertions of Umney, based on investigations of Wright and Juergens, stating that the impure base described by Wright and Luff, by them is regarded as retaining still some aconitine, and that the observations of Juergens relate to a minute quantity of substance, too small to be properly investigated. The inferences of Umneyare therefore based on insufficient data.—Chem. Drug., Nov. 1891, 792.

*Aconitine—Crystalline.*—Papers by W. R. Dunstan and W. H. Ince. Pharm. Jour. and Trans., 1891, March, 857; July, 55–58.

*Aconitinum Nitricum.*—By M. J. Schroeder. (Ned. Ph., 1891, Nr. 3, 152; R. Pha., 2, 86, ⅛.)—Chem. Centralblatt, 1891, 671.

*Adonis amurensis, Regg. et Radd.*—An ornamental plant largely cultivated in Japan. Y. Tahara has found a similar glucosidal constituent therein as that found in A. vernalis, Linné. The chemical and physical differences are not evident, as it was obtained only approximately pure. Tahara distinguishes it as "adonidin," in regard to the results of physiological experiments by Prof. Inoko, who found that although "adonidin" acts qualitatively completely analogous to Cervello's adonidin, it is con-

siderably less toxic.—Berichte, xxiv., 2579; Phar. Jour. and Trans., 1891, 268.

*Active Principle of Anemone sylvestris.*—M. Dupuy (Congrès des Sociétés Savantes) finds this to be a well-defined solid which crystallizes in needles. He says: "From a therapeutic point of view anemonin is an agent of great value, acting efficaciously in acute and chronic bronchial catarrh, and as a calmative of the spasmodic and irritative cough of pertussis. It is also of value in eye troubles dependent upon the rheumatic diathesis, and possesses powerful emmenagogue properties. In elevated doses it has a considerable toxicity, causing hiccough, stupidity, trembling of the limbs, bloody dejecta, perversions of sense, convulsions, and death by paralysis."—Nouv. Rem., July 8; Am. Jour. Pharm., Sept. 1891, 463.

*Synthesis of Chelidonic Acid and Pyron.*—By A. Peratoner and B. Strazzeri (Gazz. Chim., xxi., 300–312.)—Berichte, 1891, 24, 574.

*Anemonin.*—By Beckurts. (Arch. der Pharmacie, 1892, vol. 230, p. 182.) The author has investigated the acrid constituent present in various kinds of anemone and other ranunculaceous plants, and finds the sharp, burning taste and irritating effects due to a substance which he terms anemone-camphor, the composition of which has hitherto been unknown. This substance undergoes decomposition soon after its isolation under conditions that are not precisely known, as for instance during the drying of the plants in which it occurs. The products of this alteration are anemonin and isoanemonic acid. The plants in question also contain as constituents, or as products of secondary decomposition, anemonin and two acids, anemonic and anemoninic acids. Beckurts finds that contrary to previous statements the composition of anemonin is represented by the molecular formula $C_{10}H_8O_4$. When treated with acetic anhydride, anemonin is converted into an isomeric substance, isoanemonin.

Anemonin is an unsaturated compound, and it combines with four atoms of bromine without separation of hydrobromic acid. The anemonic acid, $C_6H_{10}O_6$, present in small amount in the Ranunculaceæ is also formed by boiling a water solution of anemonin with lead oxide. It is bibasic, and contains either an aldehyde or a ketone group. The anemonic acid, $C_{10}H_{12}O_6$, occurring in these plants is also formed by heating anemonin with acids or with bases. It is bibasic, and its composition is probably represented by the formula

$$C_7H_9 \begin{cases} C(OH)_2 \\ COOH \\ COOH. \end{cases}$$

The amorphous isoanemonic acid produced by the breaking up of anemonin-camphor has the same composition as anemonic acid, from which it probably differs in the same manner that isoanemonin differs from anemonin. The investigation of these compounds will be carried out further. —Pharm. Jour. and Trans., 1892, 1005, 1006.

*Delphinium Staphisagria*, Linné—*Alkaloids from the Seeds of.*—In the J. Pharm. (5), xxiii., 302–306; from Pharm. Zeit. Russ., xxix., 641; reprinted from the Jour. Chem. Society, July, Charalampi has deduced from direct analysis the formula for *delphinine* as $C_{67}H_{49}NO_{14}$. This he also obtained from the composition of its aurochloride and platinochloride. This differs sensibly from the composition by Dragendorff and Marquis in 1877. He obtained delphisine, delphinoidine, and staphisagrine; the latter appears to him to be really a mixture of four amorphous alkaloids.—Phar. Jour. and Trans., 1891, 68, 69.

*The Hellebores of the Ancients.*—Being a summary in the Gardeners' Chronicle, Jan., 2, 1892, by C. Wolley Dod, of what is known of the famous hellebores of the ancients.—Phar. Jour. and Trans., 1892, 618, 619.

*Hellebore—A Root from the West Coast of Africa* offered as white hellebore (Veratrum) proved to be derived from a scitamineous plant; its history serves to show the practical importance of a knowledge of the microscopic features of the officinal drugs.—Pharm. Jour. and Trans., 1892, 877.

*The Hydrastis Alkaloids* are three in number, hydrastine, berberine, and canadine; this last alkaloid, first discovered by F. Wilhelm, is easily isolated, owing to its difficultly soluble salts. It forms white lustrous needles, melting at 134° C., has the formula $C_{21}H_{21}NO_4$, and is, chemically, dihydromethyl-berberine.—Ernst Schmidt, Apotheker Ztg., 1891, 522; Am. Jour. Pharm., 1891, 539.

*Hydrastine.*—A contribution by Martin Freund and Carl Dormeyer to our knowledge of hydrastine.—Berichte, 24, 2730–2741.

*Hydrastine.*—By M. Freund and C. Dormeyer (Berichte, 24, 3164). The question as to whether the bromomethylhydrohydrastinine described by the authors (Abstr., 1891, 1518,) is related to the compound obtained by Merlin (Abstr., 1884, 1385; 1887, 164,) from dimethylpiperidinine and bromine, and is therefore an ammonium bromide, has yet to be settled.—Jour. Chem. Soc., 1892, 223.

*A Third Alkaloid in Hydrastis Root.*—By Prof. F. B. Power.—Pharm. Rundschau, 1891, 262, 263.

*Hydrastine and Hydrastinine—Physiological Action.*—According to M. Freund, both are haemostatic, but differ in their action upon the heart; hydrastinine not being a heart poison, nor has it any tetanic action.—Pharm. Post, 1891, 881.

*Paeonol.*—W. N. Nagai has investigated this substance, which was obtained in 1878, by Yagi, from the root of Paeonia Moutan. It is easily isolated by extracting the root with ether, shaking the ethereal tincture with sodium carbonate, which removes the impurities, and finally with soda solution, which takes up the paeonol. This solution is acidulated with sulphuric acid, and the paeonol extracted by shaking with ether. Paeonol

has the formula $C_9H_{10}O_3$, crystallizes in shining needles which melt at 50° C., and volatilize with aqueous vapors. It has an aromatic odor, a burning taste, is but little soluble in cold water, easier in hot water, and easily in alcohol, ether, benzol, chloroform, and carbon bisulphide. With iron chloride it gives a red-violet coloration. It is not soluble in alkaline carbonates and ammonia, but easily in caustic alkalies. On melting with potassa is first formed resacetophenone ($C_6H_3.COCH_3.OH.OH$), part of which is oxidized to beta-resorcylic acid, and finally, part of the latter splits into carbonic acid and resorcin. Paeonol is a paramethoxyortho-hydroxy-acetophenone.—Chem. Zeitg. (Rep.), 1891, 331, from Ber., 1891, xxiv., 2847.

### RESEDACEÆ.

*Mignonette—Reseda odorata—Use.*—It is stated that a tea from the flowers is used in Russia as a reliable remedy for tapeworm. The tea is drunk while fasting, and followed up by a strong dose of castor oil.—Chem. Drug., Sept. 1891, 473.

### RHAMNACEÆ.

*Ceanothus americanus*, Linné.—The bark of the root of this plant was examined by Mr. Frank C. Gerlach. He found an alkaloid (ceanothine), a red coloring matter (ceanothus red), tannin, resin, volatile oil, vegetable wax, fixed oil, gallic acid, glucose, saccharose, starch, albuminoids, calcium oxalate, and mucilage. In a special estimation of tannin by precipitation with gelatin and alum, he calculated 6.48 per cent. The yield of alkaloid (ceanothine) was 0.52 per cent. It was readily soluble in chloroform, separating on evaporation in granular crystals fusing at about 190° C. Not so soluble in ether, alcohol and carbon disulphide. Taste, distinct bitter. Ceanothine resembles caffeine in not forming salts. It differs from caffeine in being precipitated by Mayer's reagent. When heated with soda lime, ammonia is readily liberated. When heated on platinum foil it burned without residue. It reduced metallic gold from solution of gold chloride, and gave characteristic white precipitates with Mayer's reagent, platinic chloride, phosphomolybdic acid and tannin, also red precipitates with potassium tri-iodide, cadmium iodide, and bismuth iodide. When applied to the dry substance, conc. $H_2SO_4$, gave a reddish-brown color, $HNO_3$ a yellow and Fröhde's reagent a blue.—Am. Jour. Pharm., July 1891, 332–334.

*Ceanothus americanus* (L.).—Proximate analysis of the root of Ceanothus americanus, by John E. Hitchcock:

| | |
|---|---|
| Moisture | 8.285 |
| Ash | 2.61 |
| Petroleum benzin extract | .926 |
| Ether " | 1.91 |
| Alcohol " | 3.25 |

| | | |
|---|---|---|
| Aqueous extract | 5.88 | |
| Alkali " | { 4.74 / 14.03 | |
| Acid " | 12.80 | |
| Cellulose and Lignin | 43.20 | |
| Loss | 2.37 | |
| | —— | 100.00 |

—Am. Jour. Pharm., 1891, 430–432.

*Ceanothus americanus* (L).—The leaves were analyzed by John A. Buckner, with a view of seeing how nearly they resembled the tea leaves in chemical composition. Several methods were employed for the extraction of an alkaloid. With each negative results were obtained. The per cent. of tannin is 9.45; it readily yields gallic acid. From the alcoholic extract he obtained a crystalline substance, giving reactions with ferric chloride and lead acetate, corresponding to quercitrin.—Am. Jour. Phar., 1891, 428-430.

*Frangulin.*—T. E. Thorpe and A. K. Miller find, on closer examination, that the formula given at first, $C_{22}H_{22}O_9$ (see Proceedings 1890, xxxviii. 702), is not correct, the results obtained by the hydrolysis of frangulin proving that Schwabe's formula, $C_{21}H_{20}O_9$, is the correct one. (Proc. 1889, xxxvii., 492). The two products obtained by hydrolysis are emodin $C_{15}H_{10}O_5$, and rhamnose, $C_6H_{12}O_5$; this shows that Schwabe's supposition is highly probable: Emodin + rhamnose = frangulin + $H_2O$.—Chem. News, 1891, lxiv., 305; Jour. Chem. Soc., lxi., 1; Pharm. Jour. and Trans., 1892, 612.

*Frangulin—Preparation.*—T. E. Thorpe and A. K. Miller find that the tedious precipitation of the tannin from the extract by lead acetate (see Proceedings 1890, xxxviii., 702,) may be omitted, and they now merely evaporate the alcoholic extract to dryness with sand or barium sulphate, and exhaust with ether. The crude frangulin is purified by extracting it with boiling alcohol in fractions. The first fractions are contaminated with emodin, and the last fractions contain a foreign substance which is separated from the frangulin with great difficulty. The intermediate fractions yield frangulin in a microcrystalline condition, exhibiting a magnificent golden satiny lustre. By hydrolysis frangulin yields emodin, which is best obtained by boiling 1 gm. for some hours with a mixture of 35 c.c. of alcohol, 15 c.c. of water, and 3 c.c. of concentrated hydrochloric acid. As the hydrolysis proceeds, the frangulin gradually disappears, and a clear, reddish-brown solution is finally obtained. The solution is transferred to a dish and the alcohol driven off by heat, gradually replacing it with water, when the emodin separates as an insoluble crystalline substance.

The foreign body, contaminating the last fractions of the alcoholic extraction of the crude frangulin, is probably an isomeric trihydroxymethyl-

anthraquinone. The product of hydrolysis, soluble in water, proved to be rhamnose (frangula sugar).—Journ. Chem. Soc., 1892, lxi., 1–9.

ROSACEÆ.

*Acæna splendens*, Hook. et Arn.—Used as an emmenagogue and in liver complaints in the northern and central parts of Chili. A description of the drug as in the Museum of the Pharmaceutical Society will be found in Pharm. Jour. and Trans., 1892, 879.

*Almonds—Artificial.*—It is stated that almonds (in Europe) have been found mixed with a remarkably close imitation, made chiefly of glucose, and scented with nitrobenzol.—Zeits. Oester. Apoth.-Ver., 1891, 433; from Pharm. Zeitg., 1891, 435.

*Natural Oil of Bitter Almond.*—For distinguishing an artificial from a natural oil it is proposed by Wender to heat the oil with 1 c.c. of a mixture of equal parts of alcohol and sulphuric acid and two drops of an aqueous solution (½ per cent.) of furfurol. The natural oil gives a brownish violet color increasing in intensity for 24 hours. The artificial oil assumes a rose color, gradually changing to pure violet. Unfortunately mixtures of the two oils cannot be distinguished by this reaction. (Boll. Farm., Nov. 1891, 680; through Journ. de Pharm. d'Anvers, 1892, 23.)—Am. Jour. Pharm., 1892, 194.

*Benzaldehyde—Action of Sulphur.*—According to G. A. Barbaglia and A. Marquardt, on heating benzaldehyde with sulphur, thiobenzaldehyde and benzoic acid are formed first, and then the thiobenzaldehyde is decomposed into stilbene and sulphur.—Journ. Chem. Soc., Sept. 1891, 1049, from Ber., xxiv, 1891.

*Gillenia trifoliata.*—Frank W. White submitted this drug to a proximate analysis. His results point to the active principle being a glucoside, which was obtained by agitating an aqueous solution of the alcoholic extract with chloroform. The following is a summary of the more important constituents estimated by him:

| | *Per Cent.* |
|---|---|
| Tannin | 3.96 |
| Fat | 0.60 |
| Wax | 0.16 |
| Resin | 1.88 |
| Mucilage | 2.00 |
| Lignin | 10.23 |
| Incrusting matter | 17.43 |
| Cellulose | 27.92 |
| Moisture | 9.02 |
| Ash | 13.28 |

—Am. Jour. Pharm., 1892, 121, 122.

*Margyricarpus setosus*, R. et P.—A description of the drug and its medicinal properties.—Pharm. Jour. and Trans., 1892, 879.

*Prunus Laurocerasus*, Linn'.—Camillo Vincent and Delachanal ascertained that the cherry laurel fruits contain mannite and sorbite, probably in about equal proportions.—Comptes rendus, cxiv., 486; Phar. Jour. and Trans., 1892, 817.

*Purshia tridentata*, D. C.—Dr. V. Havard describes this plant as a diffusely-branched shrub, 3 to 5 feet high, with small fascicled leaves, cuneate-obovate, three-lobed at the apex, and solitary flowers, terminal on the short branches, the five yellow petals exceeding the calyx lobes. Common throughout the Rocky Mountain region. Between the thin and membranous epidermis of the seed and the opaque yellowish inner coat is a granulated resinous pulp, intensely and persistently bitter, which deserves attention either as a coloring or medicinal substance. A small amount of the material was sent to Prof. Trimble, who obtained the bitter principle, which does not seem to be an alkaloid, nor did it give any reactions indicating a glucoside.—Am. Jour. Pharm., 1891, 524, 525.

*Purshia tridentata*, D. C.—Prof. Trimble further examined the seeds after the dry husk-like coverings were removed. Petroleum ether dissolved 6.83 per cent. of an oily substance, consisting of wax and a saponifiable fat. Stronger ether removed 1.43 per cent. of a yellow, granular, bitter substance, evidently a neutral principle, with some resin. After the action of the two preceding solvents, absolute alcohol extracted 31.14 per cent. The solution was red in color, and upon distilling off the solvent a porous brown residue remained. On treating this residue with water a solution was obtained which had a reddish color, acid reaction, bitter taste, and a peculiar odor. This aqueous solution contained 12.03 per cent. of tannin (estimated by gelatin and alum) and 1.08 per cent. of glucose. The tannin was ironblueing.

Water removed from the residual seeds 15.43 per cent. of a faintly bitter substance. 9.72 per cent. were found to be tannin, 1.43 per cent. mucilage, and 1.62 per cent. glucose.

Dilute alkali extracted 16.00 per cent. of pectin and albuminoids and 0.43 per cent. of extractin.

Dilute acid removed 2.21 per cent., consisting of pararabin and the phosphates of calcium and magnesium. The residue yielded 4.55 per cent. of starch, leaving a residue of lignin and cellulin of 8.40 per cent.

The husks of the seeds were found to have a bitter taste, and a quantity exhausted with alcohol, the solvent recovered, the residue dissolved in acidulated water and agitated with ether, yielded on evaporation of the last solvent some of the same bitter principle obtained from the seeds.—Am. Jour. Pharm., 1892, 69–71.

*Oil of Rose—Production.*—The Chem. and Drug. (London) contains an editorial on the crop (1891), from which it appears that, allured by the high price which obtained some years ago (notably 1872), scores of new

cultivators have gone into the rose-growing business, and that overproduction has been the inevitable consequence. Roses being rather delicate plants, the yield of oil, however, is not in direct ratio to the number of roses grown.—Am. Drug., 1891, 268.

*The Rose Industry of Bulgaria.*—By Christo Christoff, Kezanlik, Bulgaria. Translated by Chas. Henry Piesse. London: Piesse and Lubin, 2 New Bond street. Octavo, cloth-bound pamphlet, with preface, table of contents, and 60 pages of text, illustrated by six wood engravings and a map of the otto of roses producing region. Price 1s. The subject matter is divided into chapters headed as follows: I. Historical; II. Geographical Situation; III. Botanical; IV. Plantations—Attention to Cultivation; V. Harvest—Distillation; VI. Otto of Roses; VII. Adulterations; VIII. Commerce.—Jour. of Chem. Soc., 1891, 865.

*Oil of Rose—Purity.*—J. Ch. Sawer states that, in view of the wholesale adulteration of its main adulterants, it is hardly possible to put reliance on the tests usually applied.—Chem. and Drug., July 25, 1891, 128.

*Oil of Rose—Detection in Oil of Geranium.*—G. Panajotow has communicated a method by which the presence of "Turkish oil of geranium (Indris Yaghi)" in true oil of rose may be discovered.

The reagent upon which the author relies is a solution of fuchsin rendered colorless by sulphurous acid. This solution was found by O. F. Müller to yield color reactions with certain resins, oils and lakes. It was found that if 2 to 3 drops of the Turkish oil of geranium were shaken with 2 c.c. of the reagent (without heat), there was produced a bluish-violet color, changing after two hours to a magnificent *blue*. The same test applied to genuine oil of rose produced, some considerable time (about twenty-four hours) after shaking, a *red* color.

Mixture of both oils, when treated in the same way, always gave a *blue* color, even if the oil of geranium was present only in small proportion. The reason is that the *blue* coloring matter always forms sooner than the red one.

Consequently, if a blue color is developed by the test (at once or within two hours), Turkish oil of geranium is present.

Another test is suggested by the author, which depends upon the action of sulphuric acid upon Turkish oil of geranium. If equal parts of the latter and of concentrated sulphuric acid are mixed in a watch-glass, the mixture becomes very hot, and gives out thick, white vapors, having a tarry odor. There is produced a brownish-red, thick liquid, which becomes turbid after addition of 95 per cent. alcohol, and separates yellow, fatty flakes. The solution becomes red, which after a while changes to yellow.

On the other hand, genuine oil of rose, when mixed with concentrated sulphuric acid, likewise produces a brownish-red mixture. This is, how-

ever, soluble in alcohol to a clear and almost colorless liquid.—Am. Drug., 1891, 335, from Ber., 1891, xxiv., 2700.

Anent of the test of Panajotow, Schimmel & Co. state that it is valueless, since oil of rose of undoubted purity, if exposed to the air for some time, gives the same color reaction with fuchsin-sulphurous acid. This reaction is due to the presence of an aldehyde. Oil of geranium always contains citral (geranium aldehyde) probably due to the oxidation of geraniol. According to the investigations of Eckart and Semmler, rhodinol is liable to be converted into an aldehyde by the action of light and air, and the trials above-mentioned proved the correctness of the supposition.—Pharm. Zeitg., 1892, 234.

*Oil of Rose—Chemistry.*—Ulrich Eckart has examined both the German and the Turkish oil of rose (the purity of which was guaranteed by Schimmel and Co.). The examination showed that both contained the same constituents, although in different proportions: (1) Ethyl alcohol, found in the fraction boiling between 70 and 100° C.; (2) Rhodinol, this constitutes the bulk of the oil and is the odorous constituent; *rose oil freed from stearopten* contains only rhodinol and is made by dissolving the oil in five volumes of 75 per cent. alcohol at a temperature of 75–80° C., cooling, with constant agitation, to 0° C., filtering, washing the separated stearopten with dilute alcohol, and allowing the alcohol to evaporate in vacuo at the ordinary temperature, when the purified oil is left. If rhodinol be distilled in quantities greater than 25–30 gm. as much as 25 per cent. will resinify. Rhodinol has the specific gravity 0.8804–0.8813 at 15° C.; is slightly lævogyre; is soluble in alcohol, ether, chloroform, benzin, benzol, carbon disulphide and glacial acetic acid; obtained from German oil it is of a green color, from the Turkish oil of a yellow color; both have a pleasant odor, suggesting a little that of mint; it has the formula $C_{10}H_{18}O$ and differs from geraniol only by different positions being occupied by the methyl- and propyl-groups; it is a methane derivative, but by the action of dehydrating agents yields limonene and dipentene. (3) The stearopten is present in amounts varying from 20–68 per cent., oils from colder climates containing more stearopten; it is probable that the stearopten comprises a homologous series of hydrocarbons, at least two hydrocarbons having been discovered (Am. Jour. Pharm., 1891, 48). In this examination 160 grams German and 460 grams Turkish oil were used, chiefly in the study of rhodinol and in the manufacture of its derivatives.—Am. Jour. Phar., 1891, 462; from Archiv Phar., July ccxxix, 355–389.

*Chemical Investigation of German and Turkey Rose Oils.*—By C. U. Eckart.—Berichte 1891, 24, 4205–4210.

*Spiræa Ulmaria, L.*—The *dried flowers* by distillation yielded salicylic acid, salicyl-aldehyde (chief constituent), methyl salicylate (minute quantity), and an aromatic liquid having the odor of coumarin. The *fresh fruit*

yielded the first three compounds, but here the methyl-salicylate was the chief constituent, and only a minute quantity of the aldehyde was obtainable. The *dried roots* furnished traces only of aldehyde, but considerable acid and chiefly methyl salicylate. From the *fresh* roots were isolated only traces of aldehyde, much acid, and absolutely no methyl salicylate. Attempts made to isolate these principles by solvents indicate that the flowers contain the acid and traces of methyl salicylate preformed, but no aldehyde; the roots, especially the dried, contain the acid and methyl salicylate and but little aldehyde. The results point to the presence in the flower of a substance which by decomposition yields the aldehyde; treated with ether, cold alcohol, boiling alcohol, water, alcohol and lime, and acidulated alcohol, mere traces of aldehyde were obtainable by distilling these solutions, indicating the difficult solubility of the substance; the insoluble residue distilled with acidulated water gave a distillate which appeared to contain the full quantity of aldehyde. These experiments conclusively prove that the aldehyde is produced by the action of a ferment upon one or more substances, since treatment with alcohol and subsequent distillation with water failed to give more than traces of aldehyde (this because the alcohol coagulated the ferment); distillation with acidulated water then effected the decomposition of the substance, with production of the aldehyde. An impure substance was obtained from the flowers which did not reduce Fehling's solution until after boiling with dilute acid; this behavior would speak for the presence of a glucoside which by decomposition produced the aldehyde—salicin was not found directly or indirectly in the flowers. This investigation also disclosed that the odor of the oil of spiræa ulmaria did not depend upon the presence of salicyl-aldehyde, but upon the presence of methyl-salicylate, vanillin and coumarin; of these only the last mentioned was not positively identified. (Dr. Schneegans and J. E. Gerock, Journ. der Pharm. Els.-Lothr., 1892, 3 and 55.)—Am. Jour. Pharm., 1892, 306, 307.

### RUBIACEÆ.

*Coffea arabica*, Linné.—Mr. William Sowerby, the veteran and distinguished Secretary of the Royal Botanical Gardens, has sent to the British Medical Journal a note on his recent pregnant suggestion for adding to the number of alkaloidal beverages by the introduction of *coffee-tea*. Coffee leaves are said to contain 1.26 per cent. of theine, and the berries only 1.0 per cent., and yet over 110,000,000 of men use the berries and only 2,000,000 the leaves of coffee, although 500,000,000 use the leaves of tea. The cultivation of coffee berries is very trying, precarious, subject to attacks of blight and unfruitfulness—in fact it follows the general line that the produce of fruit by cultivation is far more open to accident than that of leaves; and very probably good crops of coffee leaves could be obtained at small cost in countries and localities where it would be risky or even

impossible to produce berries. Here is a case open to a vast variety of peoples to solve, for there can be no reason why coffee leaves may not become a valuable item of culture in our warmer colonies and many parts of the world. The one most difficult item to move is to create the demand. —Quart. Therap. Review, Jan., 1892; Am. Jour. Pharm., 1892, 88, 89.

"*Tea and Coffee.*"—Mr. J. E. W. McFall in a paper read before the "Chemists' Assistants' Association" calls attention to the microscopical characteristics and chemical tests for pure tea and coffee. After the general microscopical characters have been considered, the facts relied upon to detect adulterations in tea are:

The ash, which should not exceed 6 or 7 per cent. (with at least 3 per cent. soluble). The percentage of extract obtained by boiling water ranges from 30 to 40 per cent. the amount of tannin being 12 to 13 per cent.

The test for chicory or caramel in coffee is to sprinkle a few grains of the substance on the surface of a glass of water. Chicory or caramel will soon color the water, while coffee does not for some time. In discovering adulterations of coffee the microscope is mostly relied upon. When identified the density of a filtered infusion is made use of to tell the proportion of the adulterant. The presence of chicory decreases the amount of caffeine, tannin, fat, and gum, while it increases the proportion of sugar.—Pharm. Jour. and Trans., 1892, 639, 641.

*Coffee Adulteration.*—A coffee was recently offered for sale in Amsterdam which, by its dark color, excited the suspicions of the purchaser. A microscopic examination revealed the structure of the true bean, but also the absence of fat globules; the ethereal extract left only about 1 per cent. residue, whereas good coffee generally yields from 13–14 per cent.; it is, therefore, evident that this sample had been exhausted for the purpose of making coffee extract, and then roasted a second time after addition of a little sugar, this explaining the dark color and polish of the sample.—(Int. Rev. f. Verfälsch.) Ztschr. f. Nahrungsm. Unters. u. Hyg., 1891, 82; Am. Jour Pharm., Aug. 1891, 405.

*Coffee Substitution—An Analysis of.*—By Dr. Moscheles and R. Stelzner. A communication from the chem.-technischen Institut of Dr. Moscheles. —Chem. Zeitung, 1892, 281, 282.

*Coffee—Examination of Concentrated Extracts of.*—By A. Domergue. —Jour. Phar. Chim., 1892, 243–247.

*The Adulterations of Coffee—Methods of Determining.*—By Frank I. Shepherd.—Mich. Pharm. Assoc.; Pharm. Era, Dec. 1891, 326–329.

*Tea and Coffee—Analytical Methods in the Study of.*—By A. Domergue and Cl. Nicholas.—Jour. Pharm. Chim., 1892, 302–306.

*Caffeine.*—See also Tea.

*Caffeine—Extraction.*—Siedler denies the correctness of Paul's asser-

tion (see Proceedings 1891, xxxix., 632) that chloroform is unsuitable for the extraction of caffeine in the presence of lime or magnesia. Siedler states that it will only be necessary to use a Soxhlet apparatus (and not a percolator), and to have the substance (tea or coffee) in a very fine powder. Alcohol is less to be recommended because it dissolves some of the lime or magnesia, and therefore gives too high results.—Am. Drug., Aug. 1891, 254; from Ber., 1891, 178.

*Caffeine—Histochemical Reaction.*—H. Molisch recommends to place a few sections of the green coffee-bean in a small drop of hydrochloric acid on a slide, and about one minute later to add a small drop of a 3 per cent. solution of auric chloride. After a while will be seen under the microscope yellowish slender acicular crystals in tufts, being a compound of caffeine hydrochlorate with auric chloride $C_8H_{10}N_4O_2HCl.AuCl_3$. The crystals of a compound of hydrochloric acid and auric chloride ($AuCl_3.HCl + 4H_2O$) which are easily formed when a stronger solution than a 3 per cent. one of auric chloride is employed, can not well be mistaken for the caffeine compound, because they appear as short and flat crystals.—Zeits. Oesterr. Apoth.-Ver., 1891, 606.

*Caffeine—Test.*—J. E. W. McFall states that the murexide reaction is the best test for caffeine. Add to caffeine a crystal of potassium chlorate and a drop or two of hydrochloric acid, and evaporate to dryness, when the residue will be found to be of a reddish color, becoming purple on the addition of ammonia.—Pharm. Jour. Trans., Feb. 1892, 641.

*Caffeine—(Tri-methyl-xanthine)—Reactions.*—For an explanation of the Roman numerals see under Chemistry.

M. P. 230.5° C. (sublimes at 180° C.). B. P. 384° C. (vapor is odorless). $C_5H(CH_3)_3N_4O_2+H_2O$.

*a.* Soluble in 75 parts of water at 15° C., in 2 parts at 70° C., in 52 parts of absolute alcohol, in 8 parts of chloroform, but less so in ether and carbon bisulphide.

*b.* The aqueous solution saturated at 15° C. tastes bitter, does not act upon litmus, and is not affected by reagents XIII., XIV. and XV.

*c.* It is not precipitated by reagents IV., V., VII., XI., XVI. and XVII., although in concentrated solutions reagent VII. does throw down a crystalline precipitate; this precipitate is more readily formed if a few drops of reagents IX. or X. are present.

*d.* Reagent XVIII. causes a precipitate to be formed in caffeine solutions, which is soluble, however, in an excess of the reagent.

*e.* If a few drops of caffeine solution be poured upon a few drops of reagent XIX., a green color will be produced in the course of a few hours.

*f.* One milligm. of caffeine when heated in a porcelain dish with 1 milligm. of potassium bromate and 1 c.c. of acetic acid, yields a red mixture, due to the formation of amalinic acid (tetra-methyl-alloxanthin,

$C_8(CH_3)_4N_4O_7$). If the mass is moistened with a little alcohol and stirred with a glass rod which has been dipped in ammonia, it will turn pink.—Pharm. Review, 1892, 26.

*Caffeine—Salts.*—Tanret asserted several years ago that caffeine could not form salts with citric, acetic and valerianic acids (see Proceedings 1883, xxxi., 280). This statement having been controverted by several chemists, Tanret was induced to repeat his investigations, and he found that caffeine crystallizes from concentrated acetic and valerianic acids without forming a salt.—Pharm. Zeitg., 1892, 92, from Journ. Pharm. Chim., 1891, 292.

*Caffeine—Two New Derivatives of.*—By G. Magnanini (Modena, 1890). Phenoxycaffein and Amyloxycaffein.—Berichte, 1892, 25, 45.

*Caffeïdin.*—By E. Schmidt and M. Wernicke (Arch. d. Pharm., 228, 516–543).—Berichte, 1892, 24, 80–82.

*Assay of Coffee.*—According to Herlant (*Monit. de la Pharm.*, Feb. 1892, 1028), the caffeine can be estimated in coffee, as follows: The finely powdered coffee is mixed with slaked lime, and this mixture extracted with a 5 per cent. solution of sodium benzoate, which dissolves the caffeine. The liquid is made alkaline with sodium carbonate and filtered. The filtrate is then extracted with a sufficient quantity of chloroform, which on evaporation yields the caffeine in the form of white silky crystals.—Am. Jour. Pharm., 1892, 194.

*Posology of Caffeine from Tea.*—By Domergue and Nicolas.—Jour. de Pharm. et de Chim., March 15, 1892; abstract in Rép. de Pharm., 1892, 155, 156).

*Posology and Extraction of Caffeine from Tea.*—By Cazeneuve and Biétrix.—Moniteur Scientifique, April 1892; Rép. de Pharm., 1892, 203–205.

*Coffee as an Antiseptic.*—By Luderitz of Vienna. (Medical Press).—National Drug., Feb. 1892, 43.

*Physiological Action of Caffeine and Allied Compounds.*—Professor Dario Baldi gives in *Terapia moderna*, Dec. 1891, the following summary of results obtained by his experiments: 1. *Caffeine* in small doses increases muscular excitability in dogs and frogs. 2. *Xanthine* has no action in this direction, but determines in the muscles the cadaveric rigidity almost to the same degree as caffeine. 3. *Allantoine* does not increase spinal excitability; but elevates muscular excitability in the frog, and determines cadaveric rigidity nearly the same as xanthine. 4. *Alloxanthine* does not increase either spinal or muscular excitability, and in the frog does not determine rigidity. 5. The spinal and muscular hyperexcitability, produced by caffeine, is due to the methyl groups attached to the xanthine nucleus; but the cadaveric rigidity is due to the xanthine

liberated in the organism.—Revue internat., Feb. 1892; Am. Jour. Phar., 1892, 231.

*Cephalanthus occidentalis,* Linn.—*Constituents.*—Edo Claassen in a former paper (see Proceedings 1889, xxxvii., 730; 1890, xxxviii., 447) described "cephalanthin," and noted the presence of citric acid with absence of malic and tartaric acids. He describes now *cephalin* and *cephaletin.* Coarsely powdered bark of cephalanthus is digested for several hours with boiling water, and strongly expressed, which operations may be repeated if necessary. Cephalanthin will be found in the residue, whilst cephalin and cephaletin are in the expressed liquid. The latter is precipitated with lead subacetate, and the precipitate, after washing and drying, is extracted with boiling alcohol. On evaporating (or distilling) the alcohol, a resin is first separated, containing cephalanthin, and on further evaporation the other two bodies crystallize out. These are purified by shaking the concentrated alcoholic solution with stronger ether, and distilling off the ether.

*Cephalin* is very difficultly soluble in cold water, much easier in boiling water, and crystallizes in long, yellowish-white, strongly-refracting, acicular crystals of an acid reaction; it is otherwise tasteless. It is soluble in alcohol, ether, chloroform, acetic acid, and in hot benzol; insoluble in petroleum ether. A concentrated alkaline solution has a lemon-yellow color, which on dilution shows blue fluorescence; both the aqueous and alcoholic solution fluoresce. This fluorescence is noticeable in very dilute aqueous solutions (1 : 2,000,000); on addition of an alkali it will be noticed when diluted 1 : 20,000,000.

*Cephaletin* crystallizes in warty crystals, otherwise it shows much the same behavior as cephalin. The latter appears to be a glucoside, which already on evaporation of the solution is split into cephaletin and glucose.—Pharm. Rundschau, N. Y., 1891, 82.

*Cinchona—Sixteen Per Cent.*—Two samples of cinchona, taken from the government gardens at Rioeng Goenoeng, were recently analyzed, and found to equal respectively 12.66 and 16.54 per cent. of sulphate of quinine.—After Chem. and Drugg.; American Drugg., 1892, 136.

*Cinchona Cultivation—Notes on.*—Some notes and illustrations on cinchona cultivation, taken from the important work of Prof. A. Tschirch (on "Indische Heil- und Nutzpflanzen und deren Cultur), are given in the American Druggist, 1892, 113–115.

*The Cinchona Association* (Limited).—An account of the formation of a syndicate to control the world's output of cinchona-bark, which appears to be nearer realization at this moment than it has been before.—Chem. and Drug., 1892, 675, 676.

*Cinchona Barks—The Provinces Producing them.*—From Zimmer & Co.'s (Vereinigte Fabriken chemisch-pharmaceutischer Producte) Jahresbericht, May, 1892; Pharm. Rundschau, 1892, 146, 147.

*Value of Cinchonas Cultivated at Reunion.*—The French government has been making experiments with the cultivation of cinchonas at Reunion. Analyses of these barks made by Houdas show that they contain but 4.32 per cent. of total alkaloids, 1.70 per cent. being quinine.—Rép. de Pharm., 1892, 90; Am. Jour. Pharm., 1892, 193.

*Cinchona Barks from New Granada.*—E. M. Holmes received from R. Thomson, of Bogota, nine specimens of rich barks from trees that are at present under cultivation. Four of these were obtained from plants found wild in New Granada, and considered by collectors to be valuable trees. These are named respectively Thomsoniana, Negra, Tuna, and Pombiana. These Mr. Holmes describes.—Pharm. Jour. and Trans., 1892, 875, 876.

*Cinchona—New Varieties.*—R. Thomson, a planter in there public of Colombia, has discovered three new varieties, the alkaloidal yield of which, together with those of some cultivated, otherwise well-known ones, is given in the following table:

| | Quinine sulph. | Quinine alk. | Cinchonidine. | Cinchonine. | Quinidine. | Amorphous. |
|---|---|---|---|---|---|---|
| Thomsoniana | 5.94 | 4.45 | 0.27 | 0.82 | 0 26 | 0.74 |
| Ledger. verde | 4.90 | 3.68 | 0.00 | 0.01 | 0.20 | 0.44 |
| Negra | 7.30 | 5.48 | 0.00 | 0.01 | trace. | 0.78 |
| Morada | 3.06 | 2.30 | 0.00 | 0.10 | 0.50 | 0.38 |
| Tuna | 9.04 | 6.78 | 0.40 | 0.38 | 0.18 | 0.42 |
| Pombiana | 5.88 | 4.41 | 0.34 | 0.02 | trace. | 0.26 |
| Officinalis | 6.32 | 4.74 | 1.23 | 0.10 | 0.07 | 0.42 |
| Succirubra | 5.93 | 4.45 | 2.77 | 0.12 | 0.02 | 0.36 |
| Hybrid | 3.32 | 2.49 | 1.92 | 0.04 | trace. | 0.52 |

The tree yielding "Negra" grows at an altitude of 8,000 feet, attains maturity with singular rapidity, resembling in this respect the Succirubra variety, and is exceedingly rare. Both flowers and leaves are very large; the latter have a rich brown color and hairy under-surface. They are without scrubbicules, or little warts, the existence of which has been held to indicate alkaloidal richness. Whether as a matter of fact, rich barks are always collateral with scrubbiculed leaves, may be doubted. The microscopical structure of the "Negra" bark indicates a relationship to that of the "Lancifolia." Thomson named the variety "Negra" because of the deep claret color of its petioles, by which the peons are able to distinguish it from other kinds. In the "Tuna" bark the resemblance to the Ledger species is very evident. Like all other kinds belonging to the Lancifolia group, the bark of this species contains numerous stone-cells, fairly well distinguishable under the microscope; in the soft or middle layer there are no stone-cells; in the other layers the cells are now arranged in solitary lines, now in clusters. The "Pombiana" variety was

discovered in Ecuador. It does not resemble any of the cinchonas in histological structure, but is like the myrtaceous plants. Its leaves are small and glossy, and its foliage is very dense. The capsules also are very small (a fact which in cinchonas is held to presage richness in quinine). The wood fibres form distinct oblong groups like those of the C. lancifolia; the leaves are leathery and narrower than those of the C. pitayensis, the flowers are hairy on the under-surface of the corolla, the petals are hairy all over, whereas in nearly all true cinchonas the petals only are fringed with hair. The "Pombiana" may be said to form a link between the Pitayo and the Lancifolia or "soft Colombian" species.—Chem. Drug., April 1892, 580.

——— M. L. Prunier has modified the ammonia test as follows: After determining the amount of moisture by drying at 100° C., sufficient of the sulphate corresponding to one gm. of the anhydrous salt is heated with thirty times as much water, until dissolved (if the anhydrous salt is taken, thirty-five parts of water will be necessary). After adding sufficient hot water to make up for that evaporated, the solution is allowed to cool to 15° C. with continuous stirring, and filtered, taking care that the temperature is kept at exactly 15° C. Of the filtrate 5 c.c. are put into each of three test tubes; to the first is added a quantity of ammonia, insufficient to completely dissolve the precipitate formed at first (7.5 c.c.) to the second sufficient to leave a barely perceptible cloudiness (about 8 c.c.), and to the third sufficient for the complete solution (about 8.5 c.c.); the temperature must be kept as nearly as possible at 15° C. The smallest quantity of ammonia which within a few minutes effects a clear solution, is to be considered as the conclusive one. Prunier has further studied the changes which take place by gradually cooling a solution, saturated at 100° C., and filtering off the separated crystals at different temperatures, comparing the results with those obtained from a known mixture of cinchona alkaloids, and whether the results of comparison could be made useful in determining the purity of quinine sulphate. He found that the crystals separated between 90° and 50° C., are remarkably pure, varying very little in their composition (a sulphate, containing 6 per cent. of other alkaloids, separated crystals, containing only 1 or 2 per cent.). By crystallizing a hot saturated solution of an impure sulphate at a higher temperature than 50° C., a tolerably pure sulphate is easily obtained. Crystals separated between 50° and 40°, contain a very large proportion of cinchonidine; separated at 35° to 25° C. will contain most of the cinchonine and cinchonidine. 100 gm. of commercial sulphate, requiring 7.5 c.c. of ammonia, dissolved in 3 kgm. of boiling water, separated 66 gm. at 60° C., requiring 6.25 c.c. of ammonia; at 40 ° C., 10 gm. crystals were separated, requiring 8 c.c.; at 30° C., 6 gm., requiring 8.5 c.c. From his investigations it appears that the temperature of 15° C. is the best which could be selected for the ammonia test. For further particulars the reader is referred to the volumin-

ous article in Journ. Pharm. Chim., 1891, xxiii., 163, 265, 333, 387.—Apoth.-Zeitg. (Rep.), 1891, 89.

*Cinchona Alkaloids—Manufacture.*—A very instructive paper by Walter D. Field on the manufacture of cinchona alkaloids, especially with reference to the treatment of the bark for extraction, will be found in Am. Drug., 1892, 152–154; from Jour. of Analyt. and Appl. Chem., 1892, and Phar. Era, 1892, 61. The following is a condensed account of the treatment of the bark:

Two hundred pounds of powdered bark are mixed with 100 gallons of water, containing 14 pounds of caustic soda, and a mixture of 96 gallons of paraffin oil and 24 gallons of fusel oil added. The mixture is then stirred for three hours, and then allowed to stand over night. In the morning the oils which have separated are drawn off and run into agitating casks, where they are shaken for ten minutes with water containing sufficient sulphuric acid to dissolve the alkaloids; this washing is repeated two or three times. The acid solutions are then allowed to stand in separators for a sufficient length of time to separate completely from the oil and other impurities. After filtering through charcoal, the alkaloidal solution is heated in steam-pans with a little charcoal to the boiling point, and then neutralized with soda, when it is run into cooling-pans and allowed to crystallize. The crystals are freed from the liquid and thoroughly dried; forming the "crude crystals." The remaining liquid is completely precipitated by soda, and the precipitate kept for future treatment. The crude crystals, which consist of quinine and a certain percentage of cinchonidine (the other alkaloids remaining in the mother-liquor), are boiled for about 15 minutes with a little charcoal, the water having been made faintly acid. The solution is then filtered twice through double filters, and allowed to crystallize; the product containing a much smaller proportion of cinchonidine (about 4 per cent.) The crystals are then dried at a temperature about 20 degrees above that of the atmosphere.

*Scientific Work upon the Cinchona Alkaloids.*—Pharm. Rundschau, 1892, 147.

*Sublimation of the Cinchona Alkaloids.*—By L. Bourgeois.—Soc. Chim. de Paris; B. Par. [3] 6.5; Chem. Centralblatt, 1891, 308.

*The Halogen Derivatives of the Cinchona Alkaloids.*—By Wm. J. Comstock and Wm. Kœnigs.—Berichte, 1892, 25, 1539–1551.

*Sulphonic Acids of Cinchona Alkaloids.*—By O. Hesse (Annalen, 267, 138–142).—Abstract in Jour. Chem. Soc., 1892, 514.

*Cinchona Bases—Action of Sulphuric Acid.*—Hesse has shown that the treatment of the four most important cinchona bases with concentrated sulphuric acid does not yield quinicine and cinchonicine, but isomers of the four bases, isoquinine, isoquinidine, etc. On operating, however, upon the hydrides of these bases, with the exception of hydrocinchonine, well-

defined crystalline sulphonic acids are obtained. When the cinchona alkaloids are dissolved in fuming sulphuric acid, the presence of isobases can be detected in the solution, but they soon disappear, and the solution contains the respective sulphonic acids. As the formation of isobases precedes that of the sulphonic acids, it may be inferred that these latter are sulphonic acids of the isobases. These compounds are all very soluble in water; the isoquinine sulphonic acid has the formula $C_{20}H_{23}N_2O_2SO_3H$.

To obtain the direct sulphuric acid derivatives the well-dried tetrasulphates were moistened with acetic anhydride, in which they swell up and form sulphates of the sulphonic acids. To obtain the sulphonic acids the mass is then dissolved in hot water and neutralized with ammonia. By recrystallization from hot dilute alcohol they may be obtained pure. Quinine sulphonic acid crystallizes in small colorless prisms, very sparingly soluble in hot water, rather more soluble in hot alcohol. The crystals appear to contain two molecules of water; when dried at 120° C. the acid melts at 209° C., decomposing and apparently passing into isosulphonic acid. The platinum salt forms concentric groups of needles. Cinchonidine sulphonic acid crystallizes in small needles, sparingly soluble in hot water and alcohol, insoluble in ether, and when dry melts at 225° C. The platinum salt has the form of orange-colored needles.—Pharm. Jour. and Trans., Jan. 1892, 562.

*Cinchonine—Reactions.*—For an explanation of the Roman numerals see under Chemistry.

*Use the sulphate.* $(C_{19}H_{22}N_2O)_2H_2SO_4+2H_2O$.

*a.* Soluble in 65 parts of water at 15° C., in 14 parts of warm water, in 5.8 parts of alcohol at 15° C., and 1.5 parts of warm alcohol; also soluble in chloroform.

*b.* When heated above its melting point, cinchonine forms a reddish, tarry mass.

*c.* Solutions of cinchonine or its salts do not fluoresce, nor do they form thalleochin as quinine does (see quinine).

*d.* A saturated solution of phenol causes cinchonine solutions to become cloudy; solution of potassium iodide when added in like volume to the cinchonine solution acts similarly, but the cloudiness disappears on the addition of more water.

*e.* Cinchonine forms no herapathite as quinine does (see quinine).

*f.* Solutions of cinchonine become cloudy when reagent II is added to them.

*g.* Chlorine water when added to cinchonine solutions causes them to turn yellow, but only after standing a day or so; this reaction takes place less readily and is less pronounced than in the case of quinine, quinidine and cinchonidine.—Pharm. Review, 1892, 26.

*Action of Hydriodic Acid on Cinchonine.*—By E. Lippmann and F. Fleissner (Monatsh., 12, 661–666; compare also, Jour. Chem. Soc., 1891,

1517; and 1892, 514). The authors have repeated some of their experiments on the formation of hydriodocinchonine, with the result that they confirm the statements made in their former communication.—Jour. Chem. Soc., 1892, 639, 640.

*Isocinchonine.*—By O. Hesse (Annalen, 266, 245–248). This article is principally controversial; the author also describes experiments which point to the conclusion that commercial cinchonine sulphate may sometimes contain two isomeric alkaloids, one of which yields isocinchonine, the other cinchoniline.—Jour. Chem. Soc., 1892, 222.

*Isocinchonines.*—By E. Jungfleisch and E. Leger (Compt. rend., 113, 651–654). A continuation of the discussion with Hesse. They found that the isocinchonine of Comstock and Koenig is identical with cinchoniline.—Jour. Chem. Soc., 1892, 222.

*Cinchonidine—Reactions.*—For an explanation of the Roman numerals see under Chemistry.

*Use the sulphate.* $(C_{19}H_{22}N_2O)_2H_2SO_4+6H_2O$.

*a.* Soluble in 100 parts of water, less so in chloroform and alcohol. Solutions do not fluoresce unless there be a trace of quinine or quinidine present.

*b.* When heated in a glass tube, cinchonidine forms a beautiful red, tarry mass.

*c.* Cinchonidine forms no thalleochin.

*d.* A saturated aqueous solution of cinchonidine, when treated with four times its volume of a saturated solution of phenol, changes to a mass of fine white crystals of the compound $(C_{19}H_{22}N_2O)_2.SO_4.C_6H_5OH+5H_2O$.

*e.* Towards a solution of potassium iodide, cinchonidine acts just like cinchonine.

*f.* Like quinine, cinchonidine forms herapathite (see quinine). It is of a yellow color, and when examined under the microscope, is seen to be made up of fine needles which turn brown when dried.

*g.* Cinchonidine solutions become cloudy when reagent II is added to them, but become clear again when an excess of the reagent has been added.—Pharm. Review, 1892, 26.

*Cupreine—Metallic Derivatives.*—A. C. Oudemans, Jr. The sodium and potassium compounds of cupreine separate as crystalline scales when a solution of the alkaloid in slight excess of the corresponding hydroxide is subjected to cold. The separated scales are dried by a filter pump, washed rapidly with strong alcohol, and placed in a desiccator over potassium hydroxide for some time. *Potassium cupreine*, $C_{19}H_{21}KN_2O_2.8H_2O$, forms acicular crystals or hexagonal scales. *Sodium cupreine*, $C_{19}H_{21}NaN_2O_2$-$5H_2O$ and $8H_2O$, forms large scales which are greasy to the touch. The author states that the alkaloid dissolves easily in concentrated ammonia, to a smaller extent in weaker ammonia, and inasmuch as the specific rotatory

power of such solutions is similar to that of like solutions of the sodium derivative, he infers that an ammonium compound does exist which is in contradistinction to Hesse, who denies the existence of such a derivative. Solutions of lithium hydroxide and of barium hydroxide also dissolve cupreine. All metallic derivatives of cupreine assume an orange or brick-red color after prolonged drying or heating above 120° C. Hesse having proven that cupreine behaves as a phenol in which hydrogen may be replaced by a metal, the author has investigated the influence such replacement has on the specific rotatory power of the alkaloid, in order to determine if the alkaloid and the base combine molecule for molecule, in which case an excess of the base ought not to affect the rotatory power to any great extent, and he publishes very complete tables of the rotatory power of the alkaloid in the above-mentioned alkaline solutions. The results are as follows: (1) Approximately the same values obtain for the sp. rot. power of the alkaloid for similar concentrations in solutions of either potassium, sodium, lithium and barium hydroxides, but in the ammoniacal solution the rot. power has a higher value, because an increased strength of the ammonia augments the sp. rot. power. (2) The sp. rot. power of the alkaloid diminishes inversely with the amount present in the alkaline solution, and also with the amount of alkaline hydroxide present. (3) The highest values for the sp. rot. power are obtained when the amounts of alkaloid and of hydroxide associated are approximately those represented by their molecular weights; cupreine in this respect being analogous to quinamine and conquinamine in acid solution. The mean rotatory power for 1 mol. (in mgm.) of cupreine in 20 c.c. water with 1–2 mols. (in mgm.) of alkaline hydroxide is about –205°.—Am. Jour. Pharm., 1891, 409; from J. Chem. Soc., 1891, 471; Rec. Trav. Chim., ix., 171–183.

*Transformation of Cupreine into Quinine.*—Referring to the announcement that Grimaux and Arnaud had succeeded in making quinine by synthesis (Compt. rend. Acad. des Sci., Apr. 13), the editor of Rêpert. de Phar., May 10th, says: "This assertion is not strictly correct; we would not detract from the merits of these able chemists, but it is admitted that we cannot really obtain quinine by synthesis until we shall have succeeded in preparing it from an artificial body. Grimaux and Arnaud obtained their quinine by operating with cupreine, a natural product, hence they have simply transformed the latter into quinine. Indeed these chemists gave their labors the unpretentious title of a 'transformation.' Cupreine is a base of *quina cuprea* or *Remijia pedunculata*, soluble in alkalies, colored by perchloride of iron, and appearing to have a phenolic character. If we compare its formula ($C_{19}H_{22}N_2O_2$) with that of quinine ($C_{20}H_{24}N_2O_2$) we find the same relation between these bases as exists between phenol ($C_6H_6O$) and its methylic ether ($C_7H_8O$). Cupreine being a body of mixed functions, part base and part phenol, quinine would be its methylic

ether. This prevision was confirmed by the authors. They added soda to cupreine in a solution of methylic alcohol, and this heated with an excess of icdide of methyl formed two iodomethylates of quinine. In replacing the icdide by the chloride of methyl, and heating to 100° C. in sealed tubes for 12 hours, free quinine was obtained. The product of the reaction was evaporated to dryness, and that portion of the cupreine not transformed was removed by a weak solution of soda. Agitation with ether dissolved the quinine, which, being transformed into the sulphate, presented the usual characters of that compound. It is notable that the natural products of certain plants often include the methylic, but never the ethylic group. The transformation of cupreine into quinine demonstrates the existence in the latter of the group ($OCH_3$). More than this, it will permit us to obtain new bases analogous to quinine, which, like that substance, will constitute cupreinic ethers. These bases will, perhaps, furnish new resources to therapeutics."—Am. Jour. Pharm., July 1891, 350–351.

*The Change of Cupreine into Quinine.*—A reply by E. Grimaux and A. Arnaud to O. Hesse.—Annalen, 1892, 267, 379, 380.

*A Contribution to the Knowledge of the Cupreine.*—By A. C. Oudemans, Jr. (Rec. trav. Chim., ix., 171–183; compare Berichte, xxii., Ref., 342).—Berichte, 1892, xxiv., 78, 79.

*Behavior of Cupreine and Quinine with Methyl Iodide.*—By O. Hesse (Annalen, 266, 240–245).—Abstract in Jour. Chem. Soc., 1892, 221.

*Preparation of Homologues of Quinine.*—By E. Lippmann (Monatsh., 12, 512–514). A method for obtaining methylquinine, being an improvement upon the Claus and Mahlmann's process (Berichte, 14).—Abstract, Jour. Chem. Soc., 1892, 222.

*Quinine—Attempted Formation from Cinchonine and Cinchonidine.*—On the supposition that the group $C_{10}H_{15}(OH)N$ in quinine is constituted similarly to the same group in cinchonine and cinchonidine, Brissonnet tried to transform the latter two alkaloids into quinine by means of fermentation. He added to a solution of cinchonine nitrate Jeannel's "manure" and honey, and exposed the mass to the air, when it soon became covered with mould. After 4 to 6 days the solution gave the characteristic green coloration peculiar to quinine, with bromine water and ammonia. Cinchonidine nitrate gave the same coloration; but no separation of quinine took place on the addition of ether and ammonia. Although the green coloration is not peculiar to quinine alone, but also is produced in the presence of hydroquinine, hydroquinidine, apoquinine and apoquinidine, besides quinidine, these experiments prove that cinchonine and cinchonidine are modified so as to give reactions similar to quinine and quinidine, when subjected to the action of certain ferments in the presence of hydrocarbons.—Chem.-Zeitg. (Rep.), 1891, 322; from Rép. Pharm., 1891, 451.

——— Brissonnet found that on passing the current from four Bunsen-elements for 15 hours through an acid solution of cinchonine or cinchonine sulphate, the solution gave on the negative pole a slight greenish coloration on the addition of bromine and ammonia.—Chem.-Zeitg., 1892, (Rep.,) 12; from Rép. de Pharm., 1891, 552.

——— Brissonnet found also that by heating cinchonine sulphate (or, still better, cinchonidine sulphate) with a solution of potassium methyl-sulphate, the solution after some time gives the well-known color reactions of thalleiochine: green with bromine and ammonia, currant-red with bromine and potassium cyanide.—Chem. Zeitg. (Rep.), 1892, 185; from Rep. Pharm., 1892, 195.

*Quinine Bihydrochlorate—Supplement to Pharm. Neerland.*—Dissolve 11 parts of quinine hydrochlorate in a mixture of 16 parts of water and 8 parts of dilute hydrochloric acid (12.5 per cent. HCl), and evaporate to dryness at 60° C., finishing the drying over potassa in an exsiccator. This salt contains 81 per cent. of quinine (alkaloid), and forms a white, amorphous mass which reddens blue litmus paper, but is stated not to affect congo paper.—Zeits. Oesterr. Apoth.-Ver., 1892, 91; from Pharm. Centralh.

*Quinine Hydrochlorate—Properties.*—The neutral quinine hydrochlorate is stated by Hesse to crystallize in bunches of needles, and when hydrated to contain two molecules of water. The water is readily separated at 120° C., without fusion of the salt; it does not melt until heated to 158° or 160° C. The quinine does not then undergo alteration and does not pass into quinicine, as might be inferred from Pasteur's statements. When an aqueous solution of the salt, saturated at 15° C., is kept for a long time at 0° C., large octahedral crystals sometimes form instead of the usual bunches of needles. On dissolving these large crystals in warm water so as to obtain a moderately saturated solution, the same crystals not unfrequently form again on cooling. This crystallization is not the result of impurity; it is pure quinine hydrochlorate, but differing in the water of crystallization, having the formula $2C_{20}H_{24}N_2O_2HCl+3H_2O$.

Acid quinine hydrochlorate, $C_{20}H_{24}N_2O_2,2HCl$, was obtained by Liebig by passing hydrochloric acid gas over dry quinine, and was described as an unstable salt. Hesse prepares it more conveniently by decomposing quinine sulphate with an equivalent proportion of barium chloride, or by mixing a solution of the neutral hydrochlorate with one molecular proportion of hydrochloric acid, and evaporating the solution at a gentle heat. The acid salt then separates, partly in concentric groups of needles and partly in a gelatinous form, which after some time becomes crystalline. Both consist of the anhydrous dihydrochlorate. The crystalline salt can be dried without alteration at 110° C., but the gelatinous salt becomes opaque at that temperature. Both give a white powder, which has a distinct blue reflection in sunlight.—Pharm. Journ. Trans., Jan., 1892, 580.

*Quinine Hydrochloride—Reactions.*—For an explanation of the Roman numerals see under Chemistry.

$C_{20}H_{24}N_2O_2.HCl+2H_2O$.

*a.* The salt loses its water of crystallization at a moderate heat, and melts to a slightly yellow colored mass. On heating higher it becomes reddish-brown, finally changing to a carmine colored tarry mass, and developing an aromatic odor. The tarry mass is dissolved by alcohol and chloroform (not by ether), the solution being colored red.

*b.* Soluble in 3 parts of alcohol, in 34 parts of water, but not in ether. An aqueous solution of the alkaloid saturated at 15° C. shows no fluorescence. This does, however, become apparent when the solution is diluted with 50 times its own volume of water, and even more plainly so when diluted with double this quantity of water and placed before a dark background. The fluorescence can more readily be produced by adding to the solution a drop of reagent XIII or XV, but not any of reagent XIV, for this at once destroys the same.

*c.* Shake together 600 milligms. of quinine hydrochloride with 3 c.c. of ether and ½ c.c. of reagent I. A clear mixture results which, however, becomes turbid and gelatinizes in the course of half a day without depositing any crystals.

*d.* Thalleiochin is formed just as in case of quinine. The green color will be masked if there is much morphine present, and in order to avoid this it is simply necessary to add more water, when the brown color due to the morphine will fade away, and the green color of the thalleiochin will become apparent.—Pharm. Review, 1892, 65.

*Ferro-Hydrochlorate of Quinine—As Hæmostatic.*—Karsch recommends this salt as a hæmostatic, possessing the same styptic properties as ferric chloride, but it is not a caustic, and its application to recent wounds is therefore painless.—Drug. Circ., 1891, 225.

*Quinine Hydrochlorides.*—By O. Hesse (Annalen, 267, 142–144).—Abstract in Jour. Chem. Soc., 1892, 514.

*Action of Hydriodic Acid on Cinchonine.*—By G. Pum (Monatsh., 12, 582–588).—Abstract in Jour. Chem. Soc., 1892, 514.

*Compounds of the Cinchona Alkaloids with Hydriodic Acid.*—By Z. H. Skraup (Monatsh., 12, 431–434).—Abstract in Jour. Chem. Soc., 1892, 83.

*Action of Hydriodic Acid on Quinine and on Quinidine.*—By A. Schubert and Z. H. Skraup (Monatsh., 12, 669–690).—Abstract in Jour. Chem. Society, 1892, 640, 641.

*Lactate of Quinine.*—Vigier some time since recommended a solution of one part of lactate in four parts of water for hypodermic injection, but now prefers a titrated solution prepared by suspending the quinine hydrate freshly precipitated by ammonia from 21.5 gms. of sulphate (= 16 gm. of quinine) in 100 gm. of hot distilled water, keeping it at a water-bath

temperature and adding lactic acid, a little at a time, until in slight excess (nearly 4.25 gm.), cooling, filtering and making the product up to 100 gm. Each 5 gm. will contain 1 gm. of lactate of quinine.—Pharm. Jour. and Trans., Aug. 1, 1891, 82; from Jour. Pharm. Chim., July 1, 5; Am. Drug., 1891, 269.

*Quinine Bisulphate—Reactions.*—For explanation of the Roman numerals see under Chemistry.

$$C_{20}H_{24}N_2O_2H_2SO_4+7H_2O.$$

*a.* Soluble in 10 parts of water or 32 parts of alcohol, which solutions redden litmus and are fluorescent.

*b.* It yields a red tarry mass when heated in a test-tube, just as the other cinchona alkaloids do.

*c.* When heated with three times its weight of lime or magnesia a brown tarry mass is formed.

*d.* Forms herapathite and thalleiochin just as the sulphate does; in fact what is true of the sulphate is true of the bisulphate as regards action with reagents.—Pharm. Review, 1892, 66.

*Quinine Sulphate—Fractional Crystallization.*—A quinine sulphate containing 6 per cent. of foreign sulphate, when saturated at 100° C., gives scarcely any deposit on cooling to 90° C.; from 90° to 50° C. the crystals have nearly a constant composition, and contain not more than 1 to 2 per cent. of impurity. Below 50° C. (and especially at about 40° C.) more than an average amount of cinchonidine appears in the deposit. Between 35° and 25° C. usually an abundant crystallization takes place, dependent on the proportion of cinchonidine and cinchonine present with the quinine; this arises from the separation in a solid form of molecular compounds, and sufficient time is required before filtering off the liquid which is to be employed for the ammonia assay of the quinine sulphate. The author, L. Prunier, found that the amount of aqueous ammonia required in the ammonia test diminishes with the temperature of filtration. The temperature of 15° C., selected for the filtration, has been singularly well chosen. —Journ. Chem. Soc., Aug. 1891, 964; from J. Pharm. (5), xxiii., 265–270 and 387–390.

*Quinine—Reactions.*—For an explanation of Roman numerals see under Chemistry.

M. P., hydrous alkaloid, 57° C.; anhydrous alkaloid, 173° C.

$C_{20}H_{24}N_2O_2+3H_2O$.

*a.* The crystallized alkaloid loses its water at 100° C., and can be obtained anhydrous by crystallizing it from a solution which had been saturated at its boiling temperature.

*b.* One part of quinine requires 700 parts of water at 100° C. and 2000 parts at 15° C. for complete solution. Solutions of quinine turn litmus blue.

*c.* One drop of reagent XIV., when dropped into 10 c.c. of an aqueous quinine solution, causes no change in the latter; but if reagent XV. be substituted, a bluish fluorescence becomes apparent, which, however, again vanishes as soon as hydrochloric acid, ammonium chloride or sodium chloride is added.

*d.* Quinine, even crystals containing water of crystallization, is readily soluble in alcohol, ether, chloroform or carbon bisulphide, but less so in petroleum benzine.

*e.* Reagents IV. to XII. and reagent XVII. cause amorphous precipitates to be formed in quinine solutions. Reagent XVI. does not precipitate quinine.

*f.* In acid solutions of quinine, chlorine forms products which become green to bluish-green or red as soon as the acid is neutralized. Thus: Put 10 drops of reagent XIII. in a beaker with 5 milligms. of quinine and add 1 milligm. of potassium chlorate (not more). Now stir the yellow mixture, adding 2 c.c. of water, and it will turn green as soon as 5 c.c. of reagent I. have been added. If the solution is now saturated with dilute sulphuric acid, it will turn red. It will also turn red if a trace of potassium ferri- or ferro-cyanide be added to the 2 c.c. of water, when these are added.

*g.* The just-mentioned green substance, thalleiochin, whose composition has not yet been determined, is also formed if the quinine is rubbed together with reagent XIV. and some calcium chloride, and then a few c.c. of reagent I. poured over the mixture. Thalleiochin is not taken up by alcohol, chloroform or ether.

*h.* A sure method of obtaining thalleiochin is as follows: Mix together 20 milligms. of quinine with the same amount of potassium chlorate, and at once add ½ c.c. of water and 1 c.c. of reagent XIII. By dropping several drops of this brownish yellow solution into 2 c.c. of reagent I., diluted with 2 c.c. of water, thalleiochin will be formed on the bottom of the test-tube. By gradually supersaturating with sulphuric acid the mixture becomes red, and then green again when made alkaline with ammonia.—Pharm. Review, 1892, 64.

*Quinine—Thalleiochin Reaction.*—Sometimes the thalleiochin reaction, as usually carried out, is a failure. Kobert recommends the following modification of it: Mix in a test-tube 0.05 gm. of a quinine salt with 0.10 gm. of chlorinated lime, 10 c.c. of water, and 20 drops of the officinal hydrochloric acid (Pharm. Helvet.). Shake vigorously, dilute to 200 c.c., and add slowly 5 c.c. of ammonia, when the green coloration will appear at once, and be strongest within a few minutes. On the addition of a mineral acid the color changes to red. With tannate and ferro-citrate of quinine the green color does not appear, but the red color will be noticed on addition of a mineral acid. A similar green color with a bluish shade will be observed by dissolving 0.05 gm. of a quinine salt in 200 c.c. of

water, and adding a few drops of acetic acid and one or two drops of saturated bromine water, and after a while 5 c.c. of ammonia.—Schweiz. Woch. Pharm., 1892.

*Quinine and Its Homologues—Preparation.*—According to the patent of a French company (Soc. Anonym. Matières Colorantes, etc.), 3.5 kilos. of cupreine, 0.250 kilos. of sodium, 30 kilos. of methyl-alcohol, and 1 kilo. of brommethyl are heated for 10 to 12 hours in an autoclave, the alcohol is then distilled off, the residue evaporated to dryness, washed with soda solution in order to remove the unaltered cupreine, and finally extracted with ether. In this way a substance is obtained which is identical with quinine. If the methyl-alcohol is replaced with ethyl-, propyl-, amyl-, butyl-, or benzyl-alcohol, etc., homologues of quinine are obtained—Chem. Zeitg., 1894, 257.

*Quinine—Hypodermically.*—Vitali and Galignani propose to use a solution of quinine hydrochlorate 10.0, in distilled water 7.5, and hydrochloric acid 2.5, which contains in each c.c. about 0.75 gm. of the hydrochlorate. This solution is injected undiluted, and it is stated that it causes no pain besides that of inserting the needle. It is especially recommended in whooping cough.—Schweiz. Woch., 1892, 15.

*Quinine and its Manufacture.*—C. Zebel.—Chem. Zeit., 1891, 15, 735, 736; Jour. Soc. of Chem. Indus., 1891, 847.

*Sulphate of Quinine—On the Production of.*—By E. Jungfleisch.—Bull. Soc. d'Encouragement Ind. Nat., 1891, 6, 604–610; Jour. Soc. of Chem. Indus., 1892, 177, 178. Also in Jour. Pharm. Chim., 1891, 199–208.

*Quinine Sulphate—Reactions.*—For an explanation of the Roman numerals see under Chemistry.

$(C_{20}H_{26}N_2O_2)_2.H_2SO_4 + 7H_2O$.

*a.* Soluble in 800 parts of water at 15°, the solution showing a decided fluorescence, which can be destroyed by diluting with 100 times its volume of water, and again produced by adding a drop of reagent XIII or XVI. The aqueous solution does not affect litmus.

*b.* The salt yields a carmine-colored tarry mass on heating in a test tube. The former is soluble in alcohol.

*c.* Pour some of reagent II into about 3 c.c. of a saturated aqueous solution of quinine sulphate, and quinine will be precipitated. On adding more (about 6.5 c.c. in all) of reagent II, the precipitate will be redissolved. It requires less lime water to dissolve quinine than it does to dissolve any other alkaloid.

*d.* Thalleiochin is formed quite readily, just as in the case of quinine and quinine hydrochloride (see under these).

*e.* Add to 1 c.c. of an aqueous solution of quinine sulphate 1 drop of reagent VI and 1 c.c. of reagent I, and a bluish-green color will be produced, which is changed to red on the addition of a few drops of dilute

sulphuric acid. This red color is produced at once, if a trace of ferrocyanide of potassium has been added, just after adding reagent VI.

*f.* Dissolve 50 milligms. of quinine sulphate in 15 c.c. of alcohol, adding 2 c.c. of dilute sulphuric acid and 5 c.c. of water, and then heat this with 200 milligms. of finely powdered iodine until all of the latter is dissolved. After standing in the cold for several hours, dark green metallic shiny crystalline flakes will be precipitated. These are supposed to have the composition:

$$4C_{20}H_{24}N_2O_2 + H_2SO_4 + 2HI + 4I + 3H_2O,$$

and are called herapathite. The filtrate from the herapathite crystals is rendered brown and turbid by adding water to it. When looked at under the microscope, the compound is seen to be made up of thin brownish-green tabular crystals, which look black as soon as two of them are placed one upon the other.

*g.* Herapathite is insoluble in water, ether or chloroform, slightly soluble in boiling alcohol, slightly more so in acetone, and most soluble in methyl alcohol, from which it crystallizes very nicely. Boiling water decomposes herapathite, as does reagent I even in the cold.

*h.* The aqueous solution of quinine sulphate is rendered turbid by reagents IV to XII, and by reagent XVI, but not by a solution of potassium iodide.

*Light Quinine Sulphate—Preparation.*—The quinine sulphate of former times was especially remarkable for its lightness, due to its containing cinchonidine sulphate; the comparatively purer quinine of the present time is denser, and the crystals are transparent. P. Carles communicates a method by following which quinine sulphate may still be obtained as light as before. This method depends on the physical action of the presence of ammonium sulphate. Sulphate of quinine is dissolved in 30 times its weight of boiling water, the vessel is removed from the source of heat, a small quantity of ammonium sulphate in rather large crystals is added and stirred for about 1 or 2 minutes, or until the latter salt has just been dissolved. The separated crystalline mass of quinine sulphate is then treated as usual. Another method, which is stated to be better, is to make a warm saturated solution of pure quinine sulphate, corresponding to about one-tenth part of the bulk of quinine solution on hand, add sufficient ammonium sulphate crystals, stir vigorously, and then to add the crystalline mass to the bulk of the hot quinine solution, stirring, and allowing to cool. The proportion of ammonium sulphate best suited appears to be 4 gm. to 1 litre of quinine solution. The author states that the addition of the ammonium sulphate, besides, diminishes the amount of quinine sulphate, usually remaining in the mother-liquor by one half.—Chem. Zeitg., 1892, (Rep.), 80; from Bull. Soc. Chim., 1892, vii., 108; Am. Jour. Pharm., 1892, 314.

*Quinine—Fluctuation of Price.*—The Oil, Paint and Drug Reporter publishes the following list:

PRICE PER OUNCE.

| | Highest. | Lowest. | | Highest. | Lowest. |
|---|---|---|---|---|---|
| 1823 | $20.00 | $16.00 | 1858 | $1.40 | $1.25 |
| 1824 | 14.00 | 12.00 | 1859 | 1.50 | 1.25 |
| 1825 | 8.00 | 8.00 | 1860 | 1.80 | 1.20 |
| 1826 | 7.00 | 5.25 | 1861 | 2.10 | 1.80 |
| 1827 | 7.50 | 6.00 | 1862 | 2.90 | 2.25 |
| 1828 | 6.00 | 3.25 | 1863 | 3.25 | 2.70 |
| 1829 | 2.90 | 2.25 | 1864 | 3.75 | 2.60 |
| 1830 | 2.50 | 1.75 | 1865 | 2.40 | 2.20 |
| 1831 | 1.50 | 1.35 | 1866 | 2.60 | 2.35 |
| 1832 | 2.00 | 1.75 | 1867 | 2.20 | 1.95 |
| 1833 | 1.87 | 1.70 | 1868 | 2.35 | 1.90 |
| 1834 | 1.80 | 1.25 | 1869 | 2.30 | 2.00 |
| 1835 | 1.65 | 1.60 | 1870 | 2.30 | 2.10 |
| 1836 | 1.58 | 1.45 | 1871 | 2.45 | 2.20 |
| 1837 | 1.40 | 1.40 | 1872 | 2.45 | 2.40 |
| 1838 | 1.90 | 1.60 | 1873 | 2.55 | 2.45 |
| 1839 | 3.30 | 2.75 | 1874 | 2.50 | 2.20 |
| 1840 | 3.12 | 2.87 | 1875 | 2.30 | 2.15 |
| 1841 | 2.62 | 2.50 | 1876 | 2.70 | 2.20 |
| 1842 | 2.00 | 1.60 | 1877 | 4.50 | 2.70 |
| 1843 | 1.80 | 1.55 | 1878 | 3.60 | 3.40 |
| 1844 | 3.00 | 2.00 | 1879 | 3.60 | 2.60 |
| 1845 | 2.40 | 2.35 | 1880 | 3.25 | 2.25 |
| 1846 | 2.40 | 2.20 | 1881 | 3.25 | 1.90 |
| 1847 | 2.40 | 2.30 | 1882 | 2.50 | 1.80 |
| 1848 | 2.70 | 2.60 | 1883 | 1.80 | 1.60 |
| 1849 | 3.65 | 2.95 | 1884 | 1.80 | .90 |
| 1850 | 3.70 | 3.70 | 1885 | 1.05 | .75 |
| 1851 | 3.25 | 3.25 | 1886 | .80 | .65 |
| 1852 | 3.00 | 2.80 | 1887 | .70 | .46 |
| 1853 | 3.20 | 2.70 | 1888 | .50 | .30 |
| 1854 | 2.50 | 2.50 | 1889 | .30 | .22½ |
| 1855 | 3.00 | 2.60 | 1890 | .32 | .23½ |
| 1856 | 2.60 | 2.40 | 1891 | .24 | .18½ |
| 1857 | 2.00 | 1.40 | | | |

—Drug. Circ., 1891, 228.

*Quinine—Influence of Phenacetine on the Reactions.*—Sestini and Campani have found: (1) Phenacetine prevents the fluorescence of solutions of quinine, especially in dilute ones. (2) Chlorine solution and ammonia color an aqueous solution of phenacetine light violet. (3) Chlorine solution and ammonia color a mixture of phenacetine and quinine sky-blue. (4) Bromine vapors, followed by a few drops of ammonia, produce the characteristic green color of quinine salts, even in the presence of phenacetine; if, however, the liquid is very acid, the color reaction will not

appear. (5) Bromine vapor colors diluted solutions of quinine yellow, also in the presence of phenacetine; in concentrated solutions, however, it produces a yellow precipitate, which disappears on the addition of ammonia, without producing a green coloration. (6) In order to obtain the green color, the bromine vapor must be allowed to act only until the appearance of a slight cloudiness, when the ammonia is added drop by drop. In this way the green color will appear also in the presence of phenacetine; it is merely darker, with a violet shade. If this greenish liquid is shaken with ether, and allowed to separate into two layers, the lower aqueous one is of a green color and the upper ethereal of a violet color.—Pharm. Zeitg., 1891, 494; Am. Jour. Phar., 1891, 483.

*Quinine—Head Symptoms Avoided.*—Dr. Levi claims that by the following combination the buzzing of the head and other unpleasant symptoms are averted:

| | |
|---|---|
| Quinine sulphate | gr. lx. |
| Pepsin | gr. lx. |
| Capsicum | gr. vi. |
| Ginger | gr. xii. |
| Sodium bicarbonate | gr. lx. |

Mix, and divide into twelve powders.

—Chem. Drug., Sept. 1891, 483.

Apoth.-Zeitg. (Rep.), 1891, 122; and Monatsh. Chem., 1891, 327 and 431, contain some interesting information about the derivatives of *quinine*, when subjected to the action of *hydriodic acid*. The authors are Lippmann and Fleissner and Skraup.

*Quinidine Sulphate—Reactions.*—For an explanation of the Roman numerals see under Chemistry.

$(C_{20}H_{24}N_2O_2)_2.H_2SO_4+2H_2O$.

*a.* When heated in a test-tube over a free flame, quinidine and its salts yield a tarry product which is less red in color than that of any other alkaloid of cinchona bark.

*b.* Soluble in about 100 parts of water, readily so in alcohol and chloroform. An aqueous solution of the salt saturated at 15° C. shows the same fluorescence as does quinine sulphate, and yields, like the latter, thalleiochin, and under the same conditions (see under quinine).

*c.* 1 c.c. of the aqueous solution gives a precipitate of quinidine when treated with reagent II, and it requires about 20 c.c of the latter to redissolve the precipitate. Even then some floccules of calcium sulphate will still be floating in the liquid.

*d.* Reagent V precipitates hydriodide of quinidine from the aqueous solution of the latter. The precipitate soon becomes granular, showing acicular crystals when looked at through the microscope. If sufficient potassium iodide solution has been added, the filtrate from the above precipitate will not become cloudy when treated with reagent I.

*e.* Quinidine solutions yield with iodine, under the same conditions as quinine (see these), a precipitate of herapathite, but not in as great an abundance, since the quinidine herapathite is more soluble than the quinine herapathite. Moreover, it is more red in its color than the latter salt, which possesses more of a green or brownish-green color.—Pharm. Review, 1892, 66.

*Tannate of Quinine.*—De Vrij recommends the following method of preparation: One part pure quinine is intimately mixed by trituration with four parts tannic acid, ten parts water added, dried on a water-bath at a temperature not exceeding 60° C., the residue powdered and again dried. The preparation contains 20 per cent. quinine.—(Ned. Tijds.) Oesterr. Ztschr. f. Pharm., 1892, 67; Am. Jour. Pharm., 1892, 142.

*Quinine Tannate—Estimation of Quinine.*—According to De Vrij, 1 gm.of the tannate is shaken in a small separatory funnel with 8 c.c. of water and 2.5 c.c. of a 30 per cent. soda solution, until the tannate has been uniformly diffused, then 15 c.c. of ether are added and the whole shaken again. Within a few minutes the liquid is separated in two limpid layers, the ethereal layer is separated from the alkaline, and the latter again shaken with 15 c.c. of ether. Both ethereal liquids are allowed to evaporate, and the residue dried and weighed. In order to test for the other cinchona bases, the separated quinine is examined by De Vrij's chromate test.—Apoth. Zeitg. (Rep.), 1891, 86, from Tijds., 1891, 113.

*Detection of Quinine in Presence of Phenacetine.*—The latter substance prevents the fluorescence of quinine sulphate, especially in dilute solutions; with chlorine water and ammonia phenacetine produces a yellowish-violet coloration, a mixture of quinine and phenacetine with these reagents producing a fine blue color. To obtain the thalleioquin test, best results are obtained with bromine-vapor: Bromine-vapor is allowed to act upon the solution until a faint turbidity results, then ammonia is added, drop by drop; proceeding in this manner the green coloration appears, although darker and inclined towards a violet; if the test be now agitated with ether and allowed to stand a while, the ethereal layer will be colored yellowish-violet and the aqueous layer green.—Sestini and Campani, Pharm. Ztg., 1891, 494; Am. Jour. Pharm., Oct. 1891, 483.

*Quinine for Hypodermic Use.*—At the meeting of May 6th of the Paris Society of Pharmacy, M. Vigier said that five per cent. solutions of lactate of quinine could not be made after this compound has once been dried. They should be made extemporaneously for this purpose. M. Barillé stated that M. Laveran no longer used lactate and hydrochlorate of quinine extemporaneously, but, taking advantage of the power of antipyrine in favoring the solubility of quinine, he used the following formula: Hydrochlorate of quinine, 1 gm.; antipyrine, 50 cgm.; water, 2 gm. The solutions are not painful to patients.—Am. Jour. Pharm., Aug. 1891, 401–402.

*Quinquina—Some Samples of Officinal.*—An examination conducted by the under-Secretary of the State Colonies for the Academy; by M. Planchon.—Jour. Pharm. Chim., 1891, 560, 561.

*Quinethyline* has been prepared by E. Grimaux and A. Arnaud (Compt. Rend., 112, 1364) by heating in sealed tubes at 95–100° C. cupreïne dissolved in alcohol, with sodium and ethyl nitrate. The dry base melts at 160° C., is very soluble in all ordinary solvents for alkaloids, and yields very fluorescent solutions with excess of sulphuric acid. The normal sulphate crystallizes in colorless efflorescing prisms, dissolves in 51 parts of water at 19° C., and with hydriodic acid and iodine yields garnet-red needles, unlike the plates of herapathite given by quinine. The new base is the ethyl-ether of cupreïne, while quinine is the corresponding methyl-ether. (See Amer. Jour. Phar., 1891, p. 350.)—Am. Jour. Pharm., 1892, 78.

*Halviva—Substitute for Quinine.*—This remedy is prepared from an East Indian plant called "Kreat" (known to old botanists as "Agathates"), held in high esteem by the natives as a tonic, and much used in malaria. Yeates Hunter prefers it to quinine, because devoid of disagreeable after-effects. It is a mild aperient.—Zeits. Oester. Apoth.-Ver., 1891, 430, from Brit. Med. Journ.

*Assay of Cinchona for Total Alkaloids.*—20 gm. in *very fine* powder are placed in a flask holding 500 c.c., 10 c.c. water of ammonia (10 per cent.) and 20 c.c. alcohol (94 per cent.) added, the mixture well shaken, and 170 c.c. ether added; allow to stand for 2–3 hours, occasionally shaking, and decant 100 c.c. of the clear liquid into a separating funnel containing 50 c.c. water and 2 c.c. dilute sulphuric acid (sp. gr. 1.117), or sufficient to give the aqueous solution an acid reaction after agitation with the ethereal solution; separate the acid, yellowish solution from the ethereal layer, warm to expel the dissolved ether, and return to the cleansed separating funnel; add 30 c.c. chloroform, then sufficient sodium hydrate solution to precipitate the alkaloids, and agitate *at once* for several minutes; the chloroform solution is removed to a small tared flask, and the agitation repeated with portions of chloroform of 20 c.c. each until the alkaline solution after acidifying fails to give a precipitate with iodine solution; distil off the chloroform or allow to evaporate, and dry the contents of the flask at 100° C. to constant weight. In case the chloroform forms an emulsion when shaken with the alkaline solution, this is poured upon a filter, well wetted with chloroform, stirred with a glass rod, and washed with a little chloroform. The success of this method depends largely upon the fineness of the powder used.

This method was deemed the best one for the assay of cinchona, and is recommended by the committee for the new Swiss Pharmacopœia.—(W. Haubensak, Schwz. Wochenschr. f. Pharm., 1891, 147.)—Am. Jour. Pharm., July 1891, 347–348.

——— *Assay.*—H. Beckurts recommends the process of W. Haubensak (see Proceedings 1891, xxxix., 405), as the most reliable, but emphasizes the necessity of using a fine powder. Haubensak obtained from a coarsely powdered bark 5.4 per cent. total alkaloids, while the same bark in very fine powder yielded by the same method 7.3 per cent.—Apoth.-Zeitg., 1891, 526.

According to Wegmueller, a comparative examination of three methods of assay gave the following results: (1) The method of Haubensak (Am. Jour. Pharm., 1891), 2.975 per cent. and 2.995 per cent.; (2) The method of Schmidt (Pharmacopœa Neerlandica), 2.2093 per cent.; and (3) The method of the Pharmocopœia Germanica III, 2.035 per cent. and 2.360 per cent. The conclusions arrived at are that Haubensak's method is the best, not only because of the higher figures obtained, but also because of the purity of the weighed alkaloids, they being entirely soluble in acidulated water.—Am. Jour. Phar., 1891, 536; from Schweiz. Woch. Phar., 1891, 363.

——— *Assay of Total Alkaloids.*—W. F. Ashley assayed twenty-five samples with the results noted below:

The method of assay used was that given in Lyons' "Manual of Assaying," but as there is some loss of Prollius' fluid by evaporation, it would be better to add Prollius' fluid to a definite weight, and, after standing the required time, weigh, and replace the loss in weight by the addition of more Prollius' fluid.

Two samples of red bark (whole), 3.56 per cent. and 5.31 per cent. respectively. Twelve samples of red bark (ground), minimum 0.73 per cent., maximum 7.38 per cent.; average, 3.17 per cent. One sample of yellow bark (whole), 4.88 per cent. Nine samples of yellow bark (ground), minimum 1.73 per cent., maximum 5.10 per cent.; average, 3.31 per cent. One pale bark, 1.31 per cent. The U. S. Ph. standard of 3 per cent. is not far below the average of current bark, but barks yielding a much higher per cent. of total alkaloid than the pharmacopœial standard may be obtained by paying for them, as the price was invariably in proportion to the yield of total alkaloids.—Am. Drug., 1891, 328.

*Galium triflorum*, Michaux.—This species was the cause of a curious though innocent mistake. A German physician in a western state ordered a quantity of leaves of "Hirschzunge" (hart's-tongue). Both names are applied to a fern, Scolopendrium vulgare, Smith. This fern is rare in the U. S. and not often found in drug stores. An entirely different indigenous plant is well known by the similar English name of deer's tongue, Trilisa (Liatris) odoratissima (Cassini), now also called vanilla plant. This latter species has been replaced by another more common plant, the sweet-scented bedstraw, which contains coumarin, probably for use as a tobacco flavor. So that the article supplied as Hirschzunge was Galium triflorum.

The package having been labelled deer's-tongue leaves, it seems that this name is now, in some localities, at least, given to the substitute for that plant for which it was formerly exclusively used.—Am. Jour. Pharm., July 1891, 327–328.

*Uncaria Gambir*, Roxburgh—*Cultivation of Gambir.*—Of the products of the Malay Peninsula, gambir is of second importance, and the current issue of the Agricultural Bulletin deals with this substance in an exhaustive manner.—Phar. Jour. and Trans., 1892, 892.

*Genipa Brasiliensis*, Mart.—*A Crystalline Principle in.*—By W. Kwasnik (Chem. Ztg., 1892, xvi., 109). By extraction of the leaves and bark of this plant, Peckolt obtained a crystalline substance which Kwasnik identifies as mannit.—Berichte, 1892, 25, 111.

*Manufacture of Gambier.*—Dr. H. Trimen records the precise mode of procedure adopted in the manufacture of gambier, as he witnessed it at Singapore.—From Ceylon Administration Reports, iv., H. 13; Pharm. Jour. and Trans., 1892, 1003, 1004.

*Gambier—Manufacture.*—According to H. Trimen, the precise mode of procedure adopted in the manufacture of gambier, as witnessed in Singapore, is as follows: The short leafy twigs are rapidly stripped off the plants by hand and carried in baskets to a low thatched shed, where large circular vats contain water in a state of complete ebullition. The leaves and twigs are immersed, and men, armed with long-handled, five-pronged forks of hard Tampines (Sloetia Sideroxylon) wood, stir and bruise them for six hours. The flaccid masses having been taken out and drained into the vat, the boiling ley is next poured into shallow wooden tubs to cool. In color of a yellowish olive-green, it has the consistence and the appearance of thin pea-soup. Solidification does not occur on cooling, but is effected by the operator thrusting a short, thick, smooth cylinder of the very soft wood of Mahang (Macaranga hypoleuca) into each of two of the wooden buckets placed before him, and agitating the mass by rubbing his fingers up and down on the surface of the cylinders. The fluid gradually thickens, and some solid matter coagulates on the fingers, and is wiped off. After this process has been continued for about a quarter of an hour, the whole mass suddenly contracts somewhat, and becomes paler in color; then in a few minutes it sets into a mass of the consistence of soapy cheese. This is probably the effect of the crystallization of the chief constituent, catechuic acid. After a few hours the mass can be turned out, as from a mould, and is cut into small cubes.—Pharm. Jour. Trans., June 1892, 1003.

*Catechin – Preparation.*—Remove the catechu-tannic acid from Gambir by treating the latter with cold water. After straining and washing the residue on the strainer with cold water, extract the catechin with hot

water, filter and cool as rapidly as possible.—H. Gutknecht, Chem. Zeitg., July 1891, 959.

*Genipa Brasiliensis*, Mart.—Peckolt obtained from this plant a crystalline substance which he considered a glucoside, and named it *genepin*. W. Kwasnik has examined this substance, which appears in minute colorless needles, possessing a strongly sweet taste. It is insoluble in ether, petroleum ether, benzol, cold alcohol, and amyl alcohol, but easily soluble in water, chloroform, anilin, boiling alcohol and amyl alcohol, and in acids. It does not contain nitrogen. Kwasnik did not succeed in splitting this substance by the action of acids or alkalies, nor did Pettenkofer's glucoside reaction give a positive result; all of which prove that genepin is neither an alkaloid nor a glucoside. On analysis the formula was found to be $C_3H_7O_3$, which is exactly half the formula for mannit, $C_6H_{14}O_6$. Genepin melts at 165° C., and the aqueous solution is optically inactive, and Kwasnik thinks himself justified in considering this substance identical with mannit.—Chem. Zeitg., 1892, 110.

*Cephaëlis Ipecacuanha*, A. Richard—*The Value of the Unofficinal Parts of Ipecacuanha.*—David Hooper examined six plants of two and a half years of age with the following results:

| | |
|---|---|
| Root contained | 1.79 per cent. of alkaloid. |
| Stems contained | 1.13 per cent. of alkaloid. |
| Leaves contained | 1.45 per cent. of alkaloid. |

The alkaloid obtained from the stem and leaves was doubtless emetine. —Pharm. Jour. and Trans., 1892, 591.

*Ipecacuanha—General Proximate Analysis of.*—By R. A. Cripps and A. Whitby. A paper read at the British Pharmaceutical Conference, Aug. 1891.—Chem. and Drug., 1891, 278, 279.

*Preparations of Ipecacuanha.*—By W. H. Symons. A paper read at the British Pharmaceutical Conference Aug., 1891, upon certain preparations of ipecacuanha which had been made for five years.

*Ipecacuanha* (so called).—A parcel of 14 bales was offered for sale in London as Brazil ipecacuanha. The root proved to be Richardsonia scabra. A sample was examined by Mr. Umney, who describes it in Chem. and Drug., 1891, 379, 380.

*Dextrose from Ipecacuanha Root.*—By E. Merck (Arch. Pharm., 229, 169–170). When preparing emetine from ipecacuanha root about 5 per cent. of a compound identical with dextrose was obtained. This compound does not appear to exist in all varieties of the root, as no sugar could be detected in samples from other sources.—Jour. Chem. Soc., 1891, 1133.

*Ipecacuanha.*—By H. H. Hoffman. Description, substitution, and tests. —Pharm. Era, Dec. 1891, 331, 332.

*Ipecacuanha.*—Adulterated with Helonias dioica.—Pharm. Post, 1892, 11.

*Ipecacuanha—False.*—A. J. Schilling.—Archiv Pharm., 1891, ccxxix., 581–585.

*Ipecacuanha.*—Alfred Dohme has subjected the assay processes of Flueckiger, Lyons and Dragendorff to a comparative examination, and found that Flueckiger's method is the most expeditious, while Lyons' gives the greatest yield; as to Dragendorff's method, Dohme states that while it is less laborious than that of Flueckiger, it is not so expeditious, and as it depends upon the use of mercurio-potassium iodide without any definite end reaction, it is not to be recommended unless all other methods fail. Where the analyst is not in an especial hurry, Dohme would recommend the method of Lyons. The comparative experiments on the same samples of ipecac gave the following results:

| | Dragendorff. | Flueckiger. | Lyons. |
|---|---|---|---|
| Sample A. | 2.4 per cent. | 2.32 per cent. | 2.95 per cent. |
| " B. | 2.2 " " | 2.18 " " | 2.60 " " |
| " C. | 2.3 " " | 2.21 " " | 2.80 " " |
| " D. | 1.97 " " | 2.10 " " | 2.40 " " |

Lyons' method, as given in his "Manual," is the following:

Ten gm. of ipecac root in No. 30 powder, or finer, are set aside for fifteen hours, after having been thoroughly shaken in a 250 c.c. flask with 100 c.c. of Prollius' fluid (concentrated ether 325 c.c., alcohol 25 c.c., and concentrated ammonia 10 c.c.).

Connect with a condenser and distil off the ether on a water bath. Add a little ether to redissolve oily matter and then about 5 c.c. of water containing about ½ c.c. of 5 per cent. sulphuric acid. Shake well, and set the flask on a water bath to evaporate off all the ether. Filter the remaining liquid, which must no longer smell of ether, through a small filter into a small separating funnel, and wash both flasks and filter with water. Return filter paper to flask and again treat with ether as before, adding a little more sulphuric acid. Filter again. Continue this until a drop of the acid solution does not render Mayer's solution turbid. Add 10 c.c. of ether to the solution in the separating funnel, close tightly, and shake. Separate the ether and put it into the waste ether bottle. Now render alkaline with ammonia and shake out the alkaloids with a mixture consisting of 3 parts of ether and 1 part of chloroform, using about 15 c.c. of the latter mixture at a time, and continuing until the alkaline solution no longer becomes turbid when treated with Mayer's solution. Evaporate the combined chloroform-ether solution to dryness at a moderate heat, finally heating to constant weight at 100° C. in a glass evaporating dish.

The weight of emetine found, when multiplied by 20, gives the percentage of emetine in the drug under assay.—Am. Drug., 1892, 76; from Pharmaceutical Review, 1892, 15.

*Ipecacuanha—Alkaloidal Value of the Leaves and Stems.*—D. Hooper, working on a suggestion of Flueckiger, examined the leaves and stems of Indian cultivated variety from Nilambur in the Malabar district. The plants were two and a half years of age. The roots, stems and leaves were powdered separately, exhausted with warm alcohol, the percolate evaporated to dryness on a water bath, and extracted with water, acidulated with sulphuric acid. After filtering and washing with water, the clear liquid was treated with freshly prepared Mayer's solution, 1 c.c. of which corresponds with 0.0189 gm. of emetine, until a precipitate ceased to be formed. The results were as follows: root 1.79 per cent. of alkaloid, stem 1.13 per cent., leaves 1.45 per cent. The alkaloid corresponded with all the tests for emetine. Herbaceous plants containing an alkaloid, almost invariably yield the same alkaloid from different parts of the plant, but in trees and shrubs different alkaloids often occupy different portions of the same plant.—Pharm. Jour. Trans., Jan. 1892, 591.

*Ipecacuanha—Menstruum.*—W. H. Symons finds that a menstruum containing about one grain of free (real) ammonia per ounce (avoir.) furnishes the best preparations of ipecacuanha. He especially recommends a tincture made from 1 ounce (avoir.) of the root moistened with 1 drachm of 10 per cent. of ammonia, and slowly percolated to 20 ounces with 10 per cent. alcohol.—Chem. Drug., Aug. 1891, 279.

J. C. Umney has tested the value of Symon's menstruum (with ammonia) and finds that it gives good results, provided a stronger alcoholic menstruum is employed, and the manipulation modified as follows: First percolate with half of the menstruum, then add the ammonia, and complete by percolating with the remainder of the menstruum. By using a

10 per cent. alcohol 25.3 per cent. of the alkaloid was left in the marc.
15 per cent. alcohol 16.8 per cent. of the alkaloid was left in the marc.
20 per cent. alcohol 16.8 per cent. of the alkaloid was left in the marc.
30 per cent. alcohol 9.7 per cent. of the alkaloid was left in the marc.
Proof spirit alcohol 5.4 per cent. of the alkaloid was left in the marc.
Rectified spirit Ph. Br. 4.8 per cent. of the alkaloid was left in the marc.

—Chem. Drug., Nov. 1891, 706.

(An ammoniacal menstruum was recommended by F. Dunn for making the syrup. See Proceedings 1888, xxxv., 75.—Reporter.)

C. R. R. Beck, as the result of several experiments, comes to the conclusion that the use of alkaline menstrua is wasteful of the alkaloid. Thus the same lot of ipecacuanha yielded with ammoniated chloroform, 2.85 per cent.; with chloroform only, 3.10 per cent.; with a mixture of 3 vols. of chloroform and 1 vol. of alcohol, 3.20 per cent.

For the powdered drug eight vols. of the menstruum was used to exhaust by hot percolation in a Soxhlet apparatus, the tincture was washed out with acidulated water, ammonia added until just past the point of neutrality, and then shaken out with chloroform, which latter was then evaporated to constant weight.—Pharm. Record, 1892, xiii., 191, from Pharm. Review, 1892, 50.

*Ipecacuanha—Remedial Use.*—Collier states that ipecacuanha is largely used at Guy's Hospital in anthrax, both internally and externally.—Chem. Drug., Aug. 1891, 279,

*Randia dumentorum* is regarded by Sir James Sawyer (The Lancet, 1891, p. 656,) as a useful addition to our repertory of nervine antispasmodics and cardiac excitants. The active principle of the unripe fruit is a saponin-like body. An ethereal tincture is recommended to be made of one part of the drug to five parts of spirit of ether.—Am. Jour. Pharm., 1891, 568.

*Saprosma fœtida*, *S. fragrans*, and *S. ceylanicum*, Bedd., possess a more fetid smell than even Celtis reticulosa.—Chem. Drug., Aug. 1891, 222.

*Sickingia rubra—A New Tan-Bark from Japan.*—(Chemiker Zeitung, 1891, 848, 1126).

RUTACEÆ.

*Oil of Bergamot—Chemistry.*— F. W. Semmler and F. Tiemann find that oil of bergamot by ultimate analysis yielded 78.53 per cent. carbon and 11.17 per cent. hydrogen; distilled under a pressure of 15 mm. decomposition is avoided, and there remains as a residue about 5 per cent. *bergaptene;* the first fraction, 60–65°, about 40 per cent., has a lemon odor, and consists of almost pure limonene, $C_{10}H_{16}$; at 77–82° the fraction consists principally of *dipentene*, $C_{10}H_{16}$, about 10 per cent.; the third fraction of about 25 per cent., distilling between 87–91°, has an odor resembling that of the oil (but to which the characteristic odor is not due), and consists of an unsaturated alcohol, *linalool*, $C_{10}H_{18}O$; the fraction 99–105°, approximated 20 per cent., had the pronounced bergamot odor, and was found to consist of *linalool acetate*, $C_{10}H_{17}O.C_2H_3O$.—Am. Journ. Pharm., 1892, 306; from Chem. Zeitg., Rep., 1892, 147.

*Oil of Bergamot.*—The sp. gr. of the oil, as given by the U. S. P. (0.860–0.890), has the lower limit too low; according to Schimmel & Co. the sp. gr. of the true oil is always higher than 0.880 (rectified oil certainly not under 0.870), and an oil of 0.860 contains probably quite considerable quantities of oil of turpentine or oil of orange.—Pharm. Centralh., 1891, 624.

——— Schimmel & Co. state that pure oil of bergamot is a scarce article. The best criteria are, the specific gravity, the rotatory power, and the solubility in alcohol.

Pure oil of bergamot: Sp. gr., 0.881 to 0.885; rotation (100 mm.), $+8°.30$ to $+19°.30$.

Pure oil of sweet orange: Sp. gr., 0.849 to 0.855; rotation (100 mm.), $+97°.4$ to $+97°.32$.

Pure oil of lemon: Sp. gr., 0.857 to 0.863; rotation (100 mm.), $+40.°10'$ to $+62°$.

Addition of oil of orange will depress the specific gravity of oil of bergamot, and at the same time increases its rotation; moreover, it will lose its solubility in a small quantity of alcohol of 90 per cent. Adulteration with oil of lemon will be somewhat more difficult to detect, the physical changes being less noticeable. Although fixed oil should be recognized by the fatty residue left on evaporation, it must not be overlooked that the pure oil on careful evaporation upon a watch glass at 100° C. leaves a green, homogeneous residue of the consistence of ointment, which at times amounts to 6 per cent.—Yearbook Pharm., 1891, 217, from Am. Drug., 1891.

*Bergapten—In Oil of Bergamot.*—According to C. Pomeranz, bergapten is the stearopten of oil of bergamot, which is found as a yellowish-white deposit in old bottles and containers; it crystallizes from boiling alcohol as acicular crystals with a silky lustre, it melts at 188° C., is insoluble in cold water and scarcely soluble in boiling water. Cold alcohol dissolves but little, and boiling alcohol easily, also glacial acetic acid, benzol and chloroform. The formula is $C_{12}H_6O_4 = C_{11}H_5O_3(OCH_3)$.

*Methyl-Bergaptic- (tenic) acid* $C_{13}H_{12}O_5$ and it methylester $C_{14}H_{14}O_5$ are obtained by the action of methyl-iodide and potassa; the acid melts at 138° C., and the ester at 52° C. Similarly is the formation of *ethyl-bergaptic- (tenic) acid*, which melts at 142° C.—Apoth. Zeitg. (Rep.), 1891, 122, from Monatsh. Chem., 1891, 379.

On fusing bergapten with potassa, Pomeranz obtained phloroglucin, which makes it very probable that bergapten is a derivative of dioxycoumarin, which latter is a derivative of phloroglucin.—Pharm. Centralh., 1892, 214.

*Galipea Cusparia*, St. Hilaire—"*Alkaloids of Angostura Bark.*"—Beckurts and Nehring have made a further investigation of the bark, and find it to contain about 1.8 per cent. of four bases in a free state, and 0.6 per cent. that is extracted by alcohol: Galipine, galipidine, cusparine and cusparidine. The examination of the ethereal oil, bitter substance and glucoside of the bark is being continued by the authors.—Archiv der Pharm., ccxxix., 591; Pharm. Jour. and Trans., 1892, 612, 613.

*Oil of Lemon—Test for Freshness.*—H. Wyatt, Jr., calls attention to the fact that the test with compound powder of tragacanth and potassium iodide described under terebene can be used for oil of lemon.—Chem. Drug., May 1892, 774.

*Oil of Lemon—Removal of Copper.*—W. H. M'Grath communicates a method for the removal of copper without impairing the odor of the oil. The oil is shaken with dilute sulphuric acid (1 acid and 2 water) in the proportion of about 15 minims to the oz. avoir.; the proportion of acid will, of course, vary with the quantity of copper present, the idea being to absorb the metal. As soon as the green color is removed, about 1 liter of water is added, the mixture well shaken and allowed to stand until separation takes place, which probably takes a quarter of an hour. After the acid has been syphoned off, the oil is repeatedly washed with water until perfectly free from acidity, the water syphoned off, and the oil digested with dried sulphate of sodium for twelve hours, and filtered through double paper filter. The acid solution may be estimated for copper.—Chem. and Drug., July 18, 1891, 84; Am. Drug., Aug. 1891, 253.

*Citral.*—Schimmel & Co. point out that citral is fully equal to thirteen times as much of pure oil of lemon (75 gm. equal to 1 kilo. of the oil). A good combination would be a mixture of 14 parts of the oil with 1 part of citral, which would be equal to 28 parts of oil.—Pharm. Rundschau, N. Y., 1892, 120.

*Oil of lemon* by fractional distillation yields three well-defined fractions:

(1) 170–170.5° C., forming a colorless, mobile liquid, sp. gr. 0.8867, and having a very fine lemon odor; it consists of limonene, $C_{10}H_{16}$, forming the tetrabromide melting at 31° C.; also the dichlorhydrate, $C_{10}H_{18}Cl_2$, crystallizing in colorless hexagonal plates, and melting at 50° C.; (2) 176–178° C., this is present to the extent of 90 per cent. in the oil, has the sp. gr. 0.899, has the same formula and molecular weight as limonene, but forms a tetrabromide melting at 102–103° C.; (3) 240–242° C. This is composed principally of sesqui-terpene $C_{15}H_{24}$, has the sp. gr. 0.9847, and is optically inactive, differing from the other two fractions. Oil of lemon is dextrogyre; according to age it may vary from 117 to 123° using a 200 mm. tube; on an average 120° will be found. Adulterations with turpentine oil may be detected by the polariscope; French turpentine oil shows a rotation of —55°; American and Russian oils +12° to +14°; thus the presence of these adulterants will decrease the rotatory power of the oil.—V. Oliveri, Apoth. Ztg., 1891, 341; Am. Jour. Pharm., Aug. 1891, 407.

*Crystalline Products of Lemon and Bergamot Oil.*—L. Crismer (Bull. Soc. Chim. (3), 6, 1891, 30) treated the residue from the distillation of oil of lemon at 10 mm. pressure with petroleum ether, until a precipitate began to form, and put the mixture aside in a cool place. After a few days warty crystals had formed, which were re-crystallized from absolute ether. The crystals fuse at 143–144° C. (289–291° F.), are colorless and odorless. Concentrated sulphuric acid colors it yellow; on addition of a

drop of nitric acid a green color, with a trace of permanganate, a blue changing to green, is developed. The formula of these crystals is $C_{10}H_{10}O_4$ (isomeric with Hoffmann's hesperetinic acid). The petroleum ether used above leaves a butyraceous mass on evaporation, which on purification with alcohol melts at 50° C. (122° F.). Oil of bergamot treated in a like manner yields a white substance fusing at 183–184° C. (371–373° F.).—Am. Jour. Pharm.. Dec. 1891, 596.

*Oil of Lemon.*—V. Olivieri (Gazz. chim., xvi., 318,) found in oil of lemon, besides the limonene (Wallach), also another terpene, $C_{10}H_{16}$, boiling at 170–170.5° C. (338–339° F.), the tetrabromide of which fuses at 31° C. (88° F.), but the dihydrochloride showing the characteristics of limonene. From the higher boiling portions the author has furthermore isolated a sesquiterpene, $C_{15}H_{24}$, boiling at 240–242° C. (464–468° F.), which increases in quantity with the age of the oil. For detecting adulteration with turpentine the author recommends the use of the polarimeter. Lemon oil is lævogyre $(a)_D = -55°$, while oils of turpentine are more or less dextrogyre. (French oil of turpentine is lævogyre.)—Am. Jour. Pharm., 1891, 597.

*Essence of Lemon—A New Form.*—Mr. Jowett, at the request of E. M. Holmes, has attempted to discover means for distinguishing between the ordinary essence of lemon and the so-called "terpene free" oil. The chief differences noted between the samples of oil supposed to be terpene free and that of ordinary oil of lemon are in their solubility, specific rotary power, and boiling point. The relative densities of the two oils differ in only a slight degree.—Pharm. Jour. and Trans., 1892, 876.

*Copper in Oil of Lemon.*—W. H. McGrath, in the "Chemist and Druggist" (1891, 84), gives a successful method for eliminating copper from oil of lemon.

*Micrococci in Orange-Flower Water.*—M. H. Barnouvin (L'Union Pharm., July,) referring to his previous researches on this preparation, says that he then obtained orange-yellow deposits, which he now finds to consist of masses of very small yellow cells of a more or less globular form, motionless, and responding by their characters to the chromogenic bacteria described by Cohn as the micrococcus luteus, and by Schrœder as the bacteridium luteum. M. Barnouvin reminds us that at this time, when the public demand that such preparations shall be carefully watched by the pharmacist, a knowledge of these points is important.—Am. Jour. Pharm., Sept. 1891, 465.

*Oil of Neroli.*—Schimmel & Co. have distilled oil of neroli from the equivalent of 560 kilos. of fresh flowers of the bitter orange, yielding 0.460 gm. This oil differs in several particulars from the French: it has a sp. gr. of 0.887, and is optically in active; at +11° C. it shows abundant separation of a solid body in fine, shining scales, and solidifies at 0° C. to a butter-like

mass. The sp. gr. of eleven samples of commercial oil varied between 0.875 and 0.889 at 15° C. Of nine oils, one was optically inactive whilst the others were all dextrorotatory, varying between —0° 52′ and —9° 40′. —Pharm. Jour. Trans., Oct. 1891, 292.

*Oil of Petit-Grain—Chemistry.*—F. W. Semmler and F. Tiemann have examined French and South American oil. It yielded by combustion 76.47 per cent. carbon and 11.14 per cent. hydrogen; the chief constituent (about 70 per cent.) boils at 102–106° under a pressure of 15 mm., has an agreeable, peculiar odor, has the composition $C_{10}H_{17}O.C_2H_3O$, and is called *aurantiol acetate.* From this ester was prepared by saponification, *aurantiol* $C_{10}H_{18}O$; it is an unsaturated alcohol, has a peculiar odor, combines with four atoms of bromine, boils at 93–95° (15 mm. pressure), is lævogyre, and at 20° C. has the specific gravity 0.8691. Besides this ester there are present in the oil a higher boiling sesquiterpene and other oxygenated constituents which naturally modify the odor of the aurantiol acetate.—Am. Jour. Pharm., 1892, 305, from Chem. Zeitg., Rep., 1892, 147.

*Pilocarpus Jaborandi,* E. M. Holmes—*Pernambuco Jaborandi.*—A plant more nearly allied to P. Selloanus, but determined as an undescribed species by E. M. Holmes.—Pharm. Jour. and Trans., 1892, 875.

*Pilocarpine—Antidote to Belladonna.*—W. McGowan reports very favorably on the use of pilocarpine in belladonna poisoning.—Yearbook Pharm., 1891, 275; from Chem. Drug., 1890.

*Effect of Pilocarpine upon Milk.*—Experimenting on cows, C. Cornevin observed (Compt. rend. Soc. biol., 1891), that the quantity of milk is not increased by pilocarpine, but that the proportion of milk sugar is slightly augmented.—Am. Jour. Pharm., 1892, 231.

*Toddalia aculeata,* Persoon—*East Indian Lopez Root.*—In the first volume of the "Materia Medica of Madras," by Mohideen Sheriff Khan Bahadur, is an article on the East Indian Lopez Root, which has recently again attracted some attention among therapeutists. He mentions the following drugs for which the preparations of the root may be substituted: For quinine and the alkaloids of cinchona, as an antiperiodic; for Warburg's tincture, antipyrine, antifebrin, phenacetin and Pulvis Jacobi, as a diaphoretic and antipyretic; and for gentian and calumba as a tonic. His article is highly interesting, well digested, and a valuable contribution to the history and application of this drug.—Am. Drug., 1892, 161, 162.

## SALICACEÆ.

*Populus Alba,* Linné.—Milton F. Schaak analyzed the bark of trees grown in the United States with the following results:

| | | |
|---|---|---|
| Petroleum ether extract | | 2.110 |
| Soluble in alcohol | 1.804 | |
| Insoluble in alcohol | .306 | |
| Stronger ether extract | | 1.036 |
| Soluble in water | .030 | |
| Soluble in alcohol | .854 | |
| Soluble in ether only | .152 | |
| Absolute alcohol extract | | 4.652 |
| Soluble in water | 2.766 | |
| Insoluble in water | 1.886 | |
| Aqueous extract | | 9.100 |
| Mucilage | 1.750 | |
| Glucose | .180 | |
| Saccharose | .216 | |
| Undetermined | 6.954 | |
| Caustic soda extract | | 2.288 |
| Pectin | 1.040 | |
| Not precipitated by alcohol | 1.248 | |
| Hydrochloric acid extract | | 7.852 |
| Parabin | 2.964 | |
| Calcium oxalate | 4.780 | |
| Undetermined | .108 | |
| Chlorine water extract | | 3.620 |
| Lignin and incrusting | 3.620 | |
| Nitric acid and chlorate of potassium extract | | 20.740 |
| Intercellular substance | 20.740 | |
| Residue | | 40.920 |
| Containing ash | 4.500 | |
| Pure cellulose | 36.420 | |
| Moisture | 6.500 | 6.500 |
| Loss | 1.820 | 1.820 |
| | 100.000 | 100.000 |

The reaction with sulphuric acid and potassium dichromate, the bitter taste of the bark, and the sweet taste of the principle dissolved by chloroform, suggest the presence of salicin and populin.—Am. Jour. Pharm., 1892, 226–228.

*Salix Lucida*, Muhlenberg—*Shining Willow*—The following is a summary of the results obtained by Robt. W. Beck by extracting the finely powdered bark successively with the different solvents:

| | *Per Cent.* |
|---|---|
| Petroleum ether | 0.37 |
| Stronger ether | 1.30 |
| Absolute alcohol | 4.39 |
| Water | 4.09 |
| Sodium hydrate (2 per cent.) | 4.04 |
| Hydrochloric acid (1 per cent.) | 4.48 |
| Chlorine water | 13.82 |
| Cellulose | 37.60 |
| Ash | 5.40 |
| Moisture | 9.70 |
| Loss and undetermined | 14.81 |
| | 100.00 |

He also employed a number of methods of assay in order to determine the yield of salicin from this bark. The following was most successful:

A hot infusion of one hundred grams of the powder was treated with lime, filtered and evaporated rapidly to a syrupy consistence. The residue was treated successively with several portions of alcohol, and the mixed alcoholic solutions passed through animal charcoal. On concentrating, beautiful crystals of salicin were obtained, amounting to 1.09 per cent.

This process was then employed for further assays, by which 0.30 per cent. of salicin were obtained from the leaves of S. lucida; 0.56 per cent. from the bark of S. alba, and 0.73 per cent. from the bark of S. nigra.

The same specimens were examined quantitatively for tannin, with the following results:

| | | | |
|---|---|---|---|
| Leaves of S. alba | 6.48 | per cent. | tannin. |
| Bark of S. alba | 3.58 | " | " |
| Bark of S. alba | 4.26 | " | " |
| Bark of S. nigra | 3.29 | " | " |

—Am. Jour. Pharm., 1891, 581–583.

### SANTALACEÆ.

*Santalum album*, Linné.—M. Adrian, in a paper published in Jour. de Pharm. et de Chim., July 15, Supp., p. vii., reprinted from Pharm. Jour. and Trans., July 18, 1891, reviews the history and therapeutic application of sandal wood.

Formerly three kinds of sandal wood were recognized:

(1) *Red sandal wood*, from *Pterocarpus santalinus* (Leguminosæ). This wood possesses no medicinal properties, and is used exclusively in dyeing on account of the red coloring matter it contains.

(2) *White* and (3) *yellow sandal wood.* The last two kinds are the produce of several trees of the genus *Santalum* (Santalaceæ). Certain authors have stated that they represent one the sap wood and the other the heart wood; but it has long been recognized that the depth of color of these woods depends solely upon the species that yields them, and the two sorts are in fact confounded under the same name.

This wood is very hard, of a more or less dark yellow color, and has a very pronounced aromatic odor. The hard trunk wood is alone sent to Europe, the branches and white wood having no value; the roots are utilized in the country where they are grown in the preparation of essential oil.

Sandal wood came originally from India. The *Santalum album* is still cultivated there in the mountains of Mysore and at Arcot in Madras. The cultivation is protected by the government, which decides every year the number of trees to be cut down. The seeds of the tree are sown together

with capsicum. The latter spring up very quickly, and the young capsicum plants protect the young sandal plants from the fierceness of the sun. They also serve the purpose of providing nourishment, as the young sandal plants, being parasitic, fix themselves upon the roots of the capsicum plants and draw from thence the necessary juices until they have attained a development, when they can nourish themselves directly by the aid of their own roots. When the trees have attained an age of twenty to thirty years they are cut down, and the trunks are freed from white wood and cut into small billets, which are sent to China or Europe. The roots are cut into chips and distilled on the spot by a very primitive process. The two ports of export from India of sandal wood and oil are Bombay and Mangalore.

The actual quantity of sandal wood oil exported from India tends to diminish. It is a strongly colored oil and always adulterated, probably with castor-oil.

Sandal wood is also met with in the Sandwich Islands, where it is yielded by *Santalum Freycinetianum*, and in the Fiji Islands, where the *Santalum Yasi* is found.

In Australia an essential oil is obtained by the distillation of *Fusanus spicatus* and *F. acuminatus*, which is beginning to arrive in the European markets, but which is less odorous, like the wood from which it is obtained.

Lastly, there is received from Venezuela, but in small quantities, an "oil of sandal wood," known as West Indian, and which is indicated in the price currents as "W. I.".

The best oil is without doubt prepared principally in France and England. It is clarified by paper filtration. Its density is about 0.975, lævogyre, neutral to litmus, soluble in alcohol, ether and chloroform, and nearly insoluble in water. Exposed to the air it oxidizes and resinifies; on the other hand gives reactions similar to oil of turpentine and other hydrocarbon essential oils. It is not rare to find this essential oil in commerce mixed with fixed vegetable or mineral oils of far inferior commercial value. This addition is easily detected.

A sophistication more difficult to recognize consists in the admixture of essential oil of cedar or copaiba, either made after distillation, or, as is sometimes practised, by distilling the cedar and sandal woods together. In this case it is not easy to detect the fraud, especially upon a brief examination. It can, however, be discovered with the aid of the polarimeter, as the addition of either cedar or copaiba oil to oil of sandal wood diminishes its rotatory power.—Am. Jour. Pharm., 1891, 449–452.

*Sandal Wood.*—P. L. Simmonds gives some statistics of the commerce in this wood. He also mentions a number of species of Santalum, which enter into commerce. Santalum Preissianum, Miquel, is very rich in oil, which is much sought after in China.—Pharm. Jour. and Trans., 1891, 65, 66.

*Notes on East India Sandal Wood.*—Taken from Part V. of the Pharmacographia Indica (by Wm. Dymock, C. J. H. Warden and David Hooper). —American Drug., 1892, 162.

SAPINDACEÆ.

*Macassar Oil.*—By K. Thümmel and W. Kwasnik (Arch. Pharm., 229, 182–197). Macassar oil is obtained from the seed of Schleichera trijuga, Willd., Cussambium spinosum, an East Indian tree. The cotyledons yield 68 per cent. of fatty oil by pressure. It is composed of glycerides of acetic, oleïc, palmitic and arachidic acids. It also contains free hydrocyanic acid and other volatile acids.—Jour. Chem. Soc., 1891, 1133.

SAPOTACEÆ.

*Balata or Chicle Gum.*—By G. S. Jenman. (Report entitled "Balata and the Balata Industry, Forest Laws, etc.") The tree yielding balata is Mimusops Balata, a large forest tree ranging from Jamaica and Trinidad to Venezuela and Guiana. The author describes the tree and the mode of collecting the milk. Regarding the character and value of balata, its strength is very great, and as it does not stretch under tension, for special appliances, such as bands of machinery, it is unequalled. It is somewhat softer at ordinary temperature and not so rigid in the cold as gutta-percha. It is used in almost all cases in which gutta-percha is used, but, on account of its higher price, only for superior purposes. It is but slowly acted upon under the influence of the atmosphere. The electrical insulating quality of balata also, it is said, is equal to that of gutta-percha.—Scient. Am.; Pharm. Era, July 11, 1891.

*Monesia bark* from Chrysophyllum glyciphlæum, *Casaretti*, has been studied by P. G. Rozanoff (Inaug. Dissert. Moscow, 1890), who considers it to be a very good expectorant, due to the presence of saponin and monesin; abounding in tannin, the bark possesses also valuable astringent properties.—Am. Jour. Pharm., July, 1891, 376.

*Sapotin* is a new glucoside obtained by G. Michaud from the seeds of *Achras Sapota, L.*, a large tree of the West Indies and Central America. To prepare the glucoside the dried seeds are rasped, dried at 100° C., freed from fat by benzine, then treated with boiling alcohol (90 p. c.), filtered, and on cooling the glucoside is deposited in microscopic crystals. These are dried, treated with ether to remove traces of fat and resin, then twice crystallized from alcohol. The substance and its vapor are irritating to nostrils and eyes, the taste is burning and acrid. It is very soluble in water and boiling alcohol, less soluble in cold alcohol, insoluble in ether, chloroform and benzine; melts at 240° C., growing brown at the same time. Its composition is:

| Calculated for. $C_{29}H_{51}O_{20}$ | Found. 1 | 2 |
|---|---|---|
| C 48.33 | 48.69 | 48.31 |
| H 7.23 | 7.33 | 7.45 |

It does not reduce Fehling's solution. When heated with water and a little sulphuric acid it is changed into glucose and an insoluble matter the author calls *Sapotiretin*.—Adapted from Am. Chem. Jour., 1892, 572, 573; Pharm. Record, 1892, 112.

SAXIFRAGACEÆ.

*A Study upon the Ripening of the Cherry Fruit and of the Products of Fermentation of the Juices of the Cherry and Currant, and the Coloring Matter in Ribes nigrum and Ribes rubrum.*—By W. Kleim. (Ztschr. f. Anal. Ch., 1891, page 401; abstract in Deutsche Chem. Zeit., 1891, 320, 321.)

SCITAMINEÆ.

*Elettaria Cardamomum*, Maton—*Cardamoms*.—In the American Druggist (1892, 86, 87,) is translated, partly in abstract, an article upon Cardamoms taken from "Indische Heil- und Nutzpflanzen," by Dr. Alex. Tschirch.

*Cardamoms*.—(From Montreal Pharm. Jour.).—Pharm. Era, June 1892, 383.

*Ceratanthera Beaumetzi*, Heckel.—M. Schlagdenhauffen has separated a resinous substance and an essential oil. The resinous extract, administered in doses of 1.20 gram, acted as a purge. Twenty drops of the essential oil given in a gelatin capsule, followed by a dose of castor oil, caused the complete expulsion of the taenia.—Bull. Gén. Thérap., 1891, 336; Pharm. Jour. and Trans., 1891, 347.

*Zingiber officinale*, Roscoe.—In an article entitled "The Trade in Ginger and Its Economic Uses," P. L. Simmonds, F. L. S., gives an account of the sources of supply and commerce of this drug. Ginger is cultivated in many parts of the world for local use, but only in a few localities on an extensive scale for shipment, to supply commercial wants. Our supplies are drawn chiefly from the East and West Indies and Africa; the imports average about 70,000 cwts. per annum, of which 40,000 cwts. are consumed in Great Britain. The Jamaica ginger is considered the best, being pale and uncoated. Cochin ginger resembles it, but is of a pale brownish tint externally.

On the Continent ginger is less used and appreciated than with us. Good ginger should be fresh, dry, heavy, not brittle, of a reddish-gray exterior. The interior, when broken, should be resinous and of a pungent taste. The finest bleached Jamaica ginger is always in demand at good prices, after which come Cochin and African bleached.

Ginger is extensively diffused throughout the islands of the Indian Archipelago, being indigenous to the East, and of pretty general use among the natives. It is, however, inferior in quality to that of Malabar or Bengal. Ginger is a good deal grown in China, and largely used in its fresh state as a condiment and also in medicine. Some small quantity is ex-

ported dried, but it is black and hard, and not much appreciated in commerce. In the young state the rhizomes are fleshy and slightly aromatic, and they are then used as preserves, or prepared in syrup. In a more advanced stage the aroma is fully developed, the texture is more woody, and they become fit for ordinary commercial ginger. The inferior sorts, when dried after immersion in hot water, form black ginger. The best roots are scraped, washed, and, after being dried in the sun, receive the name of white ginger. The East Indian and African are coated or limed gingers. The West Indian ginger is superior in quality to that of the East, because more care is paid to the culture and drying; but the production is much smaller, and hence the trade is of less importance to commerce. Ginger is imported in bags and barrels weighing a little over 1 cwt. each.

The ginger plant is extensively cultivated in British India from the Himalayas to Cape Comorin. In order to dry ginger into what is called "sonth" in India, that is, to enable it to keep, the fresh roots are put into a basket, which is suspended by a rope, and then two men, one on each side, pull it to and fro between them by a cord attached, and thus shake the roots in the basket; this process is carried on for two hours every day for three days. After this the roots are dried in the sun for eight days, and again shaken in the basket; the object of the shaking being to take off the outer scales and skin of the roots. Two days further drying completes the process, and the ginger sells at about a rupee, or 2 shillings, for 6 or 8 pounds. The value of the East Indian ginger exported went on increasing from about £63,000 (44,457 cwts.), in 1881, to over £199,000 (133,280 cwts.) in 1887; but in the last three years it has retrograded, having fallen to £70,398 (61,774 cwts.) in the financial year ending March, 1890.

In considering the West Indian production, the crop in Jamaica varies; sometimes over 320 acres are under ginger, in other years only 130 acres.

The sets used for planting are the small knots or fingers broken off the original root, as not worth the scraping or keeping. It throws out a pedicle or foot-stalk in the course of the second or third week. From my experience as a planter in Jamaica, the crop is got in in December and January, when the stalks begin to wither. The average yield may be taken to be from 1,500 to 2,000 lbs. per acre, but sometimes a much heavier crop is obtained.

The third producing district for ginger is the West African coast, where it is principally grown at Sierra Leone. About half that produced comes to England, and the other half goes to America. The value of that exported in 1868 was £18,917, and in 1869, £14,008.

Lastly, young ginger is candied and preserved to a considerable extent in the East, and comes into commerce under the section of "succades." The quantity imported into England from India and China ranges from

300,000 to 600,000 lbs., of the value of £11,000 to £25,000.—Am. Jour. Pharm., 1891, 527–531.

*Zingiber officinale, Roscoe.*—Dr. Saml. J. Riegel subjected ginger to an investigation with the view of ascertaining whether some other solvent than ether would satisfactorily extract the properties, and could be used in preparing the officinal oleoresin, and to determine the quantity obtainable from different varieties.

*Summary.*—Jamaica ginger yielded 5 per cent. of oleoresin, which can be extracted with alcohol, ether or chloroform.

East India ginger yields 8 per cent. of oleoresin, which can also be extracted with the same solvents. The oleoresin obtained represents all the medicinal virtues of the drug, and consists of two portions, a thick, viscid liquid, which contains all the pungency in a high degree, and a soft, resinous solid, free from pungency and odor. The pungent portion is soluble in benzin, but cannot be extracted from the drug with it.

This investigation would indicate that alcohol could be used instead of ether in preparing the official oleoresin.—Am. Jour. Pharm., 1891, 531–533.

*Curing of Ginger.*—Being an article on the curing of "uncoated" ginger for medicinal use.—Kew Bulletin, April; Phar. Jour. and Trans., 1892, 890.

*Preserved Ginger.*—Of the practice of ginger cultivation and the process of preserving, but little is generally known. An abstract of the methods is given from the Bulletin of the Botanical Department of Jamaica. It would seem that still further research (into the question as to whether the Chinese preserved ginger and that from the West Indies are the products of the same or of different plants), has restored the origin of the Chinese drug to the same as the West Indian, viz.: Zingiber officinale.—Jour. of the Soc. of Arts, May 13, 1891; Phar. Jour. and Trans., 1892, 987.

*Ginger—Preparation of.*—An interesting account of the different methods of preparing ginger can be found in the Trinidad Agricultural Record, Feb. 24, 1891.—Bulletin of Phar., 1891, 315.

*Notes on Chinese Ginger.*—In the Kew Bulletin of Jan., 1892, we find the report of Mr. Chas. Ford, Superintendent of Botanical Department, Hong Kong. So far as he has been able to learn, preserved ginger is made at Canton and Hong Kong only. There is a "preserved ginger" from a species of Alpinia made for native consumption in Swatow, and is exported largely to the Straits settlements and never to Hong Kong. In deciding the question as to whether Chinese ginger is the rhizome of Alpinia Galanga, Mr. Percy Groom arrives at the following conclusion: "It is safe to conclude that Chinese ginger is the rhizome of Zingiber officinale, as shown by anatomical observations, inquiries from the Chinese and observations on the flower."—American Drug., 1892, 83, 84.

*Note on a Ginger from Fiji.*—By E. H. Gane. Comparing the results of the analyses of Jamaica ginger and Fijian ginger with those obtained from Cochin China and Africa by Dr. Thresh, it is evident that the Fijian ginger is by far the richest in active constituents.—Pharm. Jour. and Trans., 1892, 802, 803.

*Fiji Ginger.*—A ginger grown at Fiji. There is good reason for hoping that it may become an article of local industry.—Kew Bulletin, April; Phar. Jour. and Trans., 1892, 890.

SCROPHULARINEÆ.

*Chelone glabra,* Linné.—William Pfeuffer submitted the over-ground portion of Balmony to a proximate analysis and detected the presence of a glucoside in the ethereal and alcoholic extracts. The peculiar disagreeable odor evolved by the decomposition of this glucoside was noticed throughout the analysis.

There were also obtained the following percentages of the usual plant constituents:

| | *Per cent.* |
|---|---|
| Moisture | 8.43 |
| Ash | 7.55 |
| Wax melting at 45° | 1.57 |
| Resin soluble in ether | 1.50 |
| Mucilage | 2.72 |
| Dextrin | .96 |
| Saccharose | 8.00 |
| Glucose | 4.50 |
| Albuminoids | .96 |
| Calcium oxalate | 2.76 |

There is still an interesting work to be done here in isolating the principle somewhat resembling tannin in its reaction with ferric chloride. Crystals giving the reaction of gallic acid were obtained from the ethereal extract.—Am. Jour. Pharm., 1892, 65, 66.

*Digitalin.*—A comparative study of the different kinds of digitalin met with in commerce has been carried out by Fouquet, and he arrives at the conclusion that digitalis contains a well defined active principle, digitalin, which possesses all the properties of the plant. The other substances obtained from digitalis and sold under the name of digitaline, may be classed into two distinct groups:

| | |
|---|---|
| 1. Digitalins soluble in chloroform and insoluble in water | Crystalline digitalin.<br>Amorphous "<br>Digitoxine " |
| 2. Digitalins insoluble in chloroform and soluble in water | German digitalin.<br>Digitalein. |

Those of the first group are, when pure, of equal activity. They are the

only forms that should be used in medicine, but preference is to be given to the crystalline digitaline. The pharmaceutical form in which digitalin is administered is considered to be of importance. The use of granules is condemned as involving uncertainty, and preference is given to a standard solution made with glycerin, alcohol, and water, containing one cubic centimetre one milligramme of digitaline.—Bull. Thérap., cxxii., 74; Pharm. Jour. and Trans., 1892, 694.

*Digitonin.*—By H. Kiliani (Ber., 24, 3951–3954). In a recent paper, Houdas states that the portion of the digitalis glucosides which is soluble in water, and was termed by Nativelle digitaleïn, consists almost entirely of a single substance, namely, that described by Schmiedeberg and Kiliani as digitonin. The author states that this is not the case, although the alcoholic solution may, as stated by Houdas, be fractionally precipitated by ether without any separation taking place; by suitable means it may be shown that Schmiedeberg's digitaleïn is really a mixture of 7 or 8 substances, and contains at most 60 per cent. of digitonin. The author replies to the criticisms of Houdas on his formula for digitonin, and maintains the accuracy of his results.

The drug usually sold as "digitalin crist." consists almost entirely of digitonin, which is quite useless for medicinal purposes. Crystallized digitonin does not give a clear solution with 600 parts of cold water, and forms an opalescent solution with 50 parts of warm water; the solutions show the frothing observed by Nativelle and Schmiedeberg even in a dilution of 1 : 2000.—Jour. Chem. Soc., 1892, 501, 502.

*Digitaleïn.*—By J. Houdas (Compt. rend., 113, 648–651).—Berichte, 1892, 25, 13, 14; also Jour. de Pharm. et de Chim., 1891, 488–492.

*Digitaleïn.*—Schmiedeberg divides the active constituents of digitalis into two classes, one soluble and the other insoluble in water. He furthermore separated the soluble digitalin into two bodies, digitonin and digitaleïn, by means of absolute alcohol. J. Houdas (Compt. rendus, 1891, cxiii., 648) concludes that there is only one compound in the soluble digitalin, viz., digitaleïn. He endeavored to separate this body, according to Schmiedeberg, by treatment with absolute alcohol and precipitation with ether, but found that the crystals obtained from the solution were identical with the portion remaining undissolved. The most characteristic property of digitaleïn is that on adding to the aqueous solution an alcohol of the fatty series, a crystalline compound, consisting of the alcohol and hydrated digitaleïn, is formed, the solubility of which is inversely to the molecular weight of the alcohol used. The body obtained with ethylic alcohol loses its alcohol and water at 110° C. (230° F.) Digitaleïn is slowly soluble in cold water, and rapidly so in hot water; this solution does not yield a crystalline product. At 250° C. (482° F.) digitaleïn cakes together; at 270° C. (516° F.) decomposition begins, and at 280° C. (536° F.) cara-

melization is complete. The aqueous solution is precipitated by tannin and ammoniacal lead acetate. On careful treatment with dilute acids the author obtained from digitaleïn two other glucosides without the appearance of glucose.—Am. Jour. Pharm., 1892, 134–135.

*Digitonin and Digitogenin.*—In a paper published in the Berichte, 24, 339–347, reprinted from Jour. Chem. Soc., 1891, p. 576, H. Kiliani states that digitonin is best obtained from commercial digitalin by extraction with 85 per cent. alcohol.

Digitonin crystallizes easily from 85 per cent. alcohol, whilst from stronger alcohol it is only obtained in the amorphous state, begins to soften at 225°, is completely melted at 235°, and is lævo-rotatory; for a 2.8 per cent. solution in 75 per cent. acetic acid, $[\alpha]_D = -50°$. The amorphous digitonin of Schmiedeberg dissolved in cold water in all proportions; the crystalline substance is sparingly soluble in water; on heating it dissolves more easily, but does not crystallize on cooling, and the solution always shows an opalescence. With concentrated sulphuric acid, it gives a red solution; the addition of a drop of bromine water greatly intensifies the reaction. Concentrated hydrochloric acid gives a colorless solution, which, after a time or on heating, turns yellow and then red. Heated with dilute hydrochloric acid under the same conditions as were before given for digitalin, it yields nearly the calculated quantities of digitogenin, dextrose and galactose. The digitogenin obtained in this way was identical in every respect with that formerly obtained from digitalin.

*Acetyldigitogenin* is obtained by heating digitogenin with anhydrous sodium acetate and acetic anhydride in a reflux apparatus for one hour, and pouring the bright-red solution in a fine stream into a large quantity of water. Digitogenin on oxidation yields, according to the conditions, three acids, which the author names respectively *digitogenic*, *oxydigitogenic* and *digitic acids*.—Am. Jour. Pharm., 1891, 453–456.

*Commercial Digitalins.*—In speaking of the therapeutic value of digitalin, J. Fouquet states (Bull. gén. Therap., 1892, p. 71,) that of the more or less active principles of digitalis the following are soluble in chloroform, but insoluble in water: Crystalline digitalin, amorphous digitalin and digitoxin; while digitalein and German digitalin are soluble in water and insoluble in chloroform. Of these principles those of the first group are the most active, and the crystallized digitalin deserves the preference. It should be given in the full dose of 1 mgm., and if insufficient diuresis should be produced, another dose of 0.5 mgm. may be given on the next or third day.—Am. Jour. Pharm., 1892, 315.

*Gelatinizing of Infusion of Digitalis.*—In the Am. Jour. Pharm., 1890, 615, the results of some investigations are given, having for their object the conditions under which this infusion will gelatinize. Dr. W. Braeutigam has now succeeded by a bacteriological investigation in determining

that a *bacillus* is the cause of the change; if a little of the culture be introduced into a sterilized infusion of digitalis, containing 5 per cent. of simple syrup, gelatinization will take place in about two days, depending somewhat upon the temperature; in the absence of the syrup, the infusion became *slimy*, but never *gelatinous*. The cultures were made by using an infusion of digitalis containing 5 per cent. simple syrup and 6–8 per cent. gelatin as the nourishing medium; the cultures have a grayish appearance with pearly lustre; the bacillus develops in an alkaline or acid medium.—Pharm. Ztg., 1891, 349; Am. Jour. Pharm., Aug. 1891, 406.

*Gelatinizing of Infusion of Digitalis.*—Continuing his research on this subject (Am. Jour. Pharm., 1891, 406), W. Braeutigam establishes the following: (1) The gelatinizing is due to a change of cane sugar; it is accompanied by the formation of small quantities of lactic acid and traces of acetic acid; the products of alteration reduce Fehling's solution. (2) The different degrees of gelatinization depend upon the quantity of the sugar and the quality and quantity of the extractive matter acting as nutriment; the extractive matter from roots and stems owing to their proportion of sugar and salts being more favorable to the change than the extractive from leaves. (3) The cultures of the Micrococcus gelatinogenus (in the previous article it was stated to be a *bacillus*, but this has been corrected, and the micro-organism given the above name) as well as the gelatinized nourishing medium have been found to exert no deleterious action upon the human or animal system. (4) The gelatinized infusion still preserves its efficacy.—Pharm. Centralhalle, 1891, 427; Am. Jour. Pharm., Sept. 1891, 458.

*The Preparation of an Infusion from Powdered Digitalis.*—By M. Perron (Jour. Pharm. Chim., 1892, 393).

*Melampyrum—Poisonous Properties of.*—By C. Czakó. (Allategészségugyi Evkönyo, 1889; see Bot. Centralblatt, 1892, Beikefte, p. 65.) The seeds of M. sylvaticum and M. arvense contain melampyrite and rhinanthin—the latter is the poisonous principle. This substance is, however, formed only in the ripe seeds, and the plants furnish a valuable food for cattle up to the period of flowering. When, however, the seeds are ripe, or nearly so, they must be carefully avoided.—Pharm. Jour. and Trans., 1892, 1028.

*Verbascum Thapsus*, Linné.—"Mullein Oil." The use of mullein oil has recently been revived in this country. It is best prepared from the fresh flowers. In the absence of these, a good preparation can be obtained by using the commercial dried mullein flowers, which are imported from Germany, by the following process:

Take of dried mullein flowers one part; alcohol one part; macerate for a few hours, and then add olive oil four parts, digest on a water-bath for several hours until the alcohol is entirely evaporated and the extraction is completed, then express.

Mr. Beringer examined a sample sold by a prominent homeopathic pharmacy and found it to be apparently a weak alcoholic tincture containing a small quantity of acid, most likely acetic. He procured a sample of another product, prepared by a prominent essential oil house in New York, and decided that it was a tincture prepared with strong alcohol from the flowers. Neither of these preparations has any claim to the title of an oil under the generally accepted definition of that term as defined in the Universal Pharmacopœia and in the National Dispensatory.—Am. Jour. Pharm., 1891, 578, 579.

"*Mullein Oil.*"—In a letter published by Boericke and Tafel, they call attention to the method of preparing this oil according to Dr. A. M. Cushing's method, which is as follows: The freshly gathered mullein blossoms are placed in a dark-colored bottle and exposed to the sun for four or five weeks. By this process a dark-colored, aromatic liquid is obtained, miscible with ether, alcohol or water. To this liquid about 15 per cent. of alcohol is added to prevent fermentation.—Am. Jour. Pharm., 1892, 3, 4.

### SIMARUBEÆ.

*Brucea sumatrana—Bitter Principle of*—(Macassar Seeds.) By F. Eyken. The fruit is used in tropical countries as an important remedy in dysentery. The bitter principle is obtained from the seeds. Brucamarin is sparingly soluble in alcohol, chloroform, and benzol, but very insoluble in ether and petroleum ether. Brucamarin contains nitrogen, and is colored violet with sulphuric acid. It is poisonous. (Nederl. Tijdsch. v. Pharm., Chem. en Toxikol, 1891, 3, 276.)—Chem.-Zeitung, 1891, 331.

*Quassiin—Preparation.*—According to Oliveri and Denardo quassiin is best isolated by digesting the finely powdered quassia with sufficient water, reducing the bulk of the liquid by evaporation, filtering, and precipitating with tannic acid. After thorough washing, the tannate is stirred in water and mixed with lead carbonate. After drying the combined lead and quassiin tannate at a gentle heat, it is extracted with hot alcohol and the alcohol distilled off, when impure quassiin will crystallize from the residue; it is then purified by repeated crystallizations from alcohol. In regard to its properties reference may be had to Proceedings 1885, xxxiii., 341. The authors call attention to the fact that alkalies will alter the quassiin.—Schweiz. Woch., 1892, 16; from Rundschau, Prag.

### SMILACEÆ.

*Recent Research on Sarsaparilla.*—An editorial upon the results of a chemical and physiological examination of the commercial drug recently undertaken in the Dorpat University, under the guidance of Prof. Kobert, by W. v. Schulz. Experiments show that the insoluble parillin of Flückiger, the saponin or similacin of Dragendorff, and the crystalline glucoside sara-saponin isolated and described by W. v. Schulz, are different, and are

members of a homologous series, to which Prof. Kobert, in 1890, assigned the general formula $C_nH_{2n-8}O_{10}$. Hydrolytic experiments showed that not only could these substances be split up into sugar and non-saccharine bodies like parigenin and sarsapogenin, but that the sarsaparilla glucosides contain several sugar radicals, which can be split off successively by treatment with dilute sulphuric acid, the sugars obtained being ordinary dextrose and galactose.

These three glucosidal substances obtained from sarsaparilla belong to the pharmacological group of sapotoxin in their action, and after internal administration to cats no absorption was observed, but only local action, such as nausea, increased flow of saliva, and diarrhœa, although rabbits appeared to bear the administration per os without any such local disturbances. The three saponins act as cardiac, muscle and nerve poisons in intravenal injections, and cause hæmoglobinuria even in small doses. The results of this investigation are condensed into a pamphlet of about 100 pages. Among the other conclusions suggested it appears that the Vera Cruz and Mexican sarsaparilla are the most useful varieties of the drug in respect of medinical value.—Chem. and Drug., 1892, 697, 698.

*Sarsaparilla.*—By Emil W. Dworak. (Pharmacologisches Institut der Universität Innsbruck.) The author has studied 10 specimens of Vera Cruz and Honduras sarsaparillas microscopically, and arranged his results in a convenient table, as follows: 1. External characters; 2. Thickness of dry root; 3. Swelling of the root; 4. Thickness of bark compared to that of the root; 5. Endodermis; 6. The cortex and its contents; 7. Epidermis and hypodermis; 8. Remarks. The author has well illustrated his paper, and lays much stress upon the characters of the hypodermis and endodermis.—Pharm. Post, 1891, 557–566.

## SOLANACEÆ.

*Alkaloids of the Solanaceæ.*—A careful investigation of the important plants of this natural order, with the view of ascertaining which of the alkaloids existed pre-formed in them, is summarized as follows:

*Belladonna root:* Young, uncultivated roots contain only hyoscyamine; older, uncultivated roots contain atropine in minute quantity with the hyoscyamine; the same alkaloids were found in older cultivated roots. *Belladonna berries:* The ripe, cultivated Atropa Belladonna nigra contain both alkaloids, the uncultivated only atropine; the unripe, uncultivated berries contain chiefly hyoscyamine, with very little atropine; the ripe berries of Atropa Belladonna lutea contain atropine with another alkaloid probably identical with atropamine. *Belladonna leaves:* Both species contain both alkaloids, hyoscyamine and atropine, the latter in minute quantity only. *Stramonium seed:* Fresh and old seeds contain chiefly hyoscyamine, with small quantities of atropine and scopolamine. *Solanum tuberosum* contains a mydriatic alkaloid along with *betaine*. *Lycium bar-*

*barum* and *Solanum nigrum* contain mydriatic alkaloids in very minute quantity, which appear to be identical with the alkaloids of Solanum tuberosum. *Nicotiana tabacum:* The leaves contain traces of mydriatic alkaloids. *Anisodus luridus:* The seeds, herb and root collected in autumn contain pre-formed only hyoscyamine (W. Schütte, Arch. der Pharm., 1891, 492).—Am. Jour. Pharm., 1891, 602–603.

*A Contribution to the Knowledge of the Alkaloids of the Solanaceæ.*—By W. Schütte (Arch. d. Pharm., 229, 492–531).—Berichte, 1891, 24, 967–968.

*The Alkaloids in Extract of Belladonna.*—The experiments of Schütte and Siebert (Am. Jour. Pharm., 1891, 602), proving that the alkaloids present in the belladonna leaves consist chiefly of hyoscyamine, made it an interesting point to determine if this alkaloid during the manufacture of the extract changed to atropine, since it has been found that the change can take place by heating to 100° C. From 10 grams of an extract, kept for about eighteen months and prepared according to the Netherland pharmacopœia, the crude alkaloids were prepared and fractionally precipitated with auric chloride; the precipitates were recrystallized from acidulated water and dried at 100° C. The first two fractions melted at 158.5° C., the third at 156.5° C., the fourth fraction was so small that the melting point could not be determined, but under the microscope it was found to consist largely of hyoscyamine-gold-chloride, while the atropine-gold-chloride could not certainly be identified. It follows, therefore, that the alkaloid present in the extract was almost entirely hyoscyamine, and that no change had taken place during the preparation of the extract (L. van Itallie, Apotheker Ztg., 1892, 27).—Am. Jour. Pharm., 1892, 141.

*Atropine—Haemostatic Action.*—Dimitrieff used atropine hypodermically with beneficial results in cases which would not yield to the usual remedies, one of the cases reported being uterine hæmorrhage. The dose was 0.3 gm. for each injection.—Am. Jour. Pharm., 1892, 230, from Wratch through Bull. Therap., 1892, 236.

*Atropine—Forensic Detection.*—Luigi Fabris states that in the presence of strychnine the reactions of atropine will be masked, unless the proportion of atropine is relatively large. The chief reliance will, therefore, have to be placed in the physiological test.—Chem. Zeitg., Rep., 1892, 156, from Terapia Moderna, 1892, 129.

*Atropine—Detection in Forensic Investigations.*—The conclusions arrived at by F. Ciotto and P. Spica, are:

(1) Vitali's reaction is only slightly less sensitive than the mydriatic action, 0.000,002 gm. being the smallest amount that can be distinctly detected by the former method. (2) The changes which an aqueous solution of atropine undergoes, are accelerated by exposure to light, and probably by dilution and a moderately high temperature; the pure alkaloid

is more readily altered than its salts, the product in either case not responding to the chromatic nor to physiological tests. (3) In the extracts from two human bodies obtained by Stas-Otto's method, Vitali's reaction was obtained in the absence of atropine : some ptomaine capable of giving this reaction must therefore exist in putrified animal remains. (4) Purification of the extracts, whilst removing a considerable portion of the atropine when present, only partially removes this ptomaine.—Yearbook Pharm., 1891, 124, from Gazzetta, xx., 619–631.

*Atropine—In Lead Poisoning.*—Dr. F. R. Humphrey concludes from some experiments that in lead poisoning atropine in full doses relieves the colic and pain in the head in the most rapid manner, and assists directly or indirectly in the removal of the lead by iodide of potassium.—Pharm. Journ. Trans., Nov. 1891, from Lancet, 1891, 1162.

*Atropine—Reactions.*—For the explanation of the Roman numerals see under Chemistry.

M. P. 115° C. $C_{17}H_{23}NO_3$. Melts in boiling water.

*a.* Soluble in ether, alcohol, chloroform and slightly in carbon bisulphide. Aqueous solutions of atropine turn red litmus paper blue and redden phenolphthaleïn paper.

*b.* One milligramme of atropine dissolved in 1 c.c. of alcohol and heated with 1 c.c. of reagent IX. on a water-bath will cause a precipitate of yellow mercuric oxide to be formed, not, however, if the atropine is added last. The reaction taking place is represented by the following equation:

$$2(C_{17}H_{23}NO_3)+HgCl_2+H_2O=2(C_{17}H_{23}NO_3.HCl)+HgC.$$

*c.* Reagents VII. and VIII. give precipitates with solutions of atropine, which soon become crystalline.

*d.* Reagent XVIII. gives a precipitate with atropine solutions, soluble in excess of the precipitant or acetic acid.

*e.* Reagent XVI. causes no precipitate, and reagent XVII. only in hot saturated solutions of the alkaloid.

*f.* 0.1 gramme of atropine, when boiled with 3 c.c. of water and 0.2 gramme of mercurous chloride, causes the latter to turn black; on filtering the boiling alkaline liquid and supersaturating this, after cooling, with dilute nitric acid, there will be formed a considerable precipitate on the addition of silver nitrate solution.

*g.* By heating about 1 milligramme of atropine in a glass tube until white fumes begin to form, then adding 1 c.c. of reagent XIII., again heating until the mass begins to turn brown, then carefully adding 2 c.c. of water, drop by drop, a very pleasant odor is developed. This is very easily destroyed if only a trace of potassium bichromate or permanganate be present before the addition of the water.

*h.* By heating 1 c.c. of glacial acetic acid with 1 c.c. of reagent XIV.

and 1 milligm. of atropine, the mixture will become fluorescent, the color being greenish yellow. The pleasant odor mentioned under *g.* can also be detected in this case.

*i.* Rub together on a porcelain plate 1 milligm. of atropine and 1 milligm. of sodium nitrate, and make a paste of this by adding to it one drop of reagent XIII. Now add to this some solid caustic potash, and moisten the mass with a few drops of alcohol; a beautiful violet color will be produced.—Pharmaceutic Review, 1892, 7.

*Atropine—Its Constitution and Synthesis.*—Apoth.-Zeitg. (Rep., 1891, 89), contains a summary of these subjects, which may find a place here.

When Ladenburg commenced his investigations, Kraut and Lossen had shown that atropine is split into tropine and tropic acid by the action of diluted alkalies or acids: $C_{17}H_{23}NO_3 + H_2O = C_8H_{15}NO + C_9H_{10}O_3$. Ladenburg proved that tropic acid is, α-phenyl- β-propionic acid,

$$C_6H_5.CH{<}^{COOH}_{CH_2OH},$$

and produced it synthetically. He also reproduced atropine from tropate of tropine by treating it with diluted hydrochloric acid on a water bath. This reproduction opened the way for the production of a whole series of tropeines, by substituting other organic acids for the tropic acid; of which tropeines homatropine is the most important. By the action of concentrated hydrochloric or sulphuric acid upon tropine *tropidine*, $C_8H_{13}N$ is obtained, which possesses a coniine-like odor, and boils at 162° C. *Tropine iodide*, $C_8H_{16}NI$, is obtained by heating tropine with fuming hydriodic acid and amorphous phosphorus at 140° C.; and *hydrotropidine*, $C_8H_{15}N$, is formed by reducing the iodide with zinc-dust and diluted hydrochloric acid. Tropine, tropidine and hydrotropidine are tertiary bases. On heating the latter base in a current of hydrochloric acid, a secondary base is obtained, *norhydrotropidine*, $C_7H_{13}N$, with evolution of chloride of methyl: this proves the presence of a methyl group in tropine. Finally, on distilling hydrochloride of norhydrotropidine with zinc-dust, *α-ethylpyridine* is formed. The constitution of atropine and tropine may, therefore, be considered thus: $C_5H_7(CH_2CH_2OH)NCH_3$ = tropine. $C_5H_7(CH_2.CH_2O.CO.CH[C_6H_5]CH_2OH)NCH_3$ = atropine.—From Chem. Zeitg., 1891, 865.

*Atropine Sulphate.*—The Austro-Hungarian Military Pharmacopœia modifies Flueckiger's odor-test (see U. S. P., p. 50,) by using concentrated phosphoric acid instead of potassium bichromate.—Pharm. Post, 1891, 948.

*Homatropine—(Oxy-toluyl-atropine)—Reactions.*—For an explanation of the Roman numerals see under Chemistry.

M. P. 98° C. $C_{16}H_{21}NO_3$.

*a.* Soluble in ether, alcohol and chloroform, but less so in water and carbon bisulphide.

*b*. It readily crystallizes from a solution in the latter, but not from ether or chloroform.

*c*. Homatropine behaves towards litmus and phenolphthalein like atropine, and also reacts exactly like this alkaloid, as stated in experiments *b*, *e*, *f* and *g* under atropine (see these); the odor developed in case of homatropine in experiment *g* is due to benzaldehyde.

*d*. If homatropine be treated as stated under atropine in experiment *h* no fluorescence will be produced, thus distinguishing it from atropine.

*e*. Finally, if homatropine be used instead of atropine in experiment *i* under atropine (which see), no color will be produced, thus again distinguishing it from atropine.—Pharm. Review, 1892, 48.

*Tropidine—Conversion into Tropine.*—A. Ladenburg states that when tropidine is treated with hydrobromic acid, a small quantity of a base is obtained which is not volatile with steam, and may thus be separated from tropidine. After purification, this base proved to be identical with tropine.—Yearbook Pharm., 1891, 36, from Ber., xxiii., 1780, 2225.

*Apo-atropine.*—Operating upon large quantities of mother-liquors, obtained as by-products of the manufacture of atropine, Merck has succeeded in isolating a base identical with apo-atropine, the salts of which are characterized by a remarkable facility of crystallization. The base in the free state melts at 60°–62° C., is very soluble in ether and alcohol, and but slightly in water. It crystallizes from ether in well-defined crystals. The formula is $C_{17}H_{21}NO_2$. Merck is of the opinion that the only difference between apo-atropine and Hesse's atropamine lies in the circumstance that Hesse did not obtain it in the crystalline state. By heating with potassa solution to 100° C., apo-atropine is but little acted upon, and it is only by using alcoholic potassa that it is completely decomposed. The products of this decomposition are tropic acid, $C_9H_8O_2$, and tropine, $C_8H_{15}NO$. The basic product obtained by Hesse was considered by him to be pseudotropine, because of the melting points of the platinum and gold salts. He describes the platinum salt of atropamine as being anhydrous and melting at 186° C., while the gold salt melts with decomposition at 195°–196° C.; Merck, however, is of the opinion that it was not pseudotropine, because he found that the base obtained by the transformation of hyoscine boils at 241°–243° C. (uncorr.), its platinum salt contains water of crystallization, and it melts at 211°–213° C., after previously blackening and with decomposition. The great tenacity with which the platinochloride of pseudotropine retains its water of crystallization is considered by Merck to have been the reason why Ladenburg and Roth, as well as Merling, found the percentage of platinum too low, and thus did not recognize the true nature of the base. In fine, Merck thinks that atropamine is identical with apo-atropine, and that the base in Gehe's crude belladonnine, having a boiling point of 242° C., is nothing else but

pseudotropine.—Pharm. Jour. Trans., June 1892, 1006; from Archiv Pharm., 1892, ccxxx.

*Belladonna—Limit of Recovery of Atropine.*—Arthur W. Adams investigated the loss which occurs in following the methods of Dunstan and Ransom (see Proceedings 1886, xxxiv., 392), and of Squibb (separator, see Proceedings 1885, xxxiii., 325). Belladonna leaves were used in these experiments. The leaves were first estimated to find the amount of alkaloid that could be obtained from them; a definite quantity of alkaloid was then added to the leaves and the alkaloid again estimated, when it was found that the atropine added had sustained a loss of 36 per cent. It was found that the chloroform used to free the original acidulated solution from fat, chlorophyll, etc., contained a large amouut of alkaloid. This was then treated according to Dr. Squibb's method, by washing with acidulated water, this solution rendered alkaline and washed with chloroform. By this means 68 per cent. of the alkaloid was recovered. From these results the conclusion may be drawn that only 68 per cent. of the atropine in belladonna leaves may be separated by Dr. Squibb's method, and 53 per cent. by Dunstan and Ransom's method. Doubtless the same would be true of the root.—Am. Drug., 1891, 328.

For the assay see *Extracta*, *Extracta Fluida*, and *Atropine*.

*Capsicum annuum.*—Th. Pabst has subjected the fruit of Capsicum annuum to a chemical analysis, and found that the

*Alkaloid*, of which traces are obtained in the examination of the fruit, is not a normal constituent but a decomposition product, which is formed in the fruits on keeping for some time, and partly due to the action of the chemicals used in the investigation.

(2) *The acrid substance*, the "capsaicin" of previous investigators, comports itself with alkalies, alkaline earths and metallic salts as an amorphous acid (resin acid), which is intimately mixed with a red coloring matter. Although Pabst did not succeed in freeing the acid from this coloring matter, it is still an open question whether the acid is chemically combined with the color or whether the latter is merely mechanically mixed with it.

(3) The fruits contain besides free *fatty acids*, which were recognized as oleic, stearic and palmitic acids.

(4) Although the *red coloring* matter could not be closely identified with carotin, it is to be concluded from the saponification experiments that this coloring matter, as well as that of other flowers and fruits, is a cholesterin of the fatty acids. Pabst prefaces his article with a resume of investigations of Felletar, Dragendorff, Thresh, Braconnot, Buchheim, and A. Meyer.—Archiv Pharm., 1892, ccxxx., 108–134.

*Daturic Acid—Some New Compounds of.*—By Prof. E. Gérard (Jour. Pharm. Chim., 1892, 8–13). Being: a neutral daturate of soda; a neu-

tral daturate of potassa; an acid daturate of soda; an acid daturate of potash; and daturates of copper, lead and silver. The author also obtained daturone and monobromodaturic acid.

*Duboisia Myoporoides—Physiological Action.*—J. N. Langley and W. L. Dickinson find, after exhaustive experiments, that the physiological action of pituri is identical with that of nicotine. They regard the presence of nicotine in pituri leaves as certain, but consider it quite possible that the latter may contain other alkaloids besides.—Yearbook Phar., 1891, 245; from Jour. Physiologie, xi., 265–306.

*Fabiana imbricata, Ruiz et Pavon.*—A plant analysis by Harry C. Loudenbeck. After the treatment of the leaves and branches with petroleum ether, he obtained, upon treatment of the drug with stronger ether, the neutral principle in small shining crystals of a pure white color. They dissolved readily in absolute alcohol, ether and chloroform, but were insoluble in water. The aqueous solution was agitated with chloroform and deposited upon evaporation the fluorescent principle in the form of minute needles which were purified, and upon recrystallizing were of a light, nearly white, color. They have a bitter taste and give an intense blue fluorescence with ammonia, which is changed by acids to a much paler but distinct rose fluorescence. With iodine in a potassium iodide solution it gives a reddish-brown precipitate; with bromine water a blue precipitate, soluble in chloroform, forming a pink solution. Strong hydrochloric acid added to the crystals, and a minute portion of potassium chlorate added, gives a bright red color, which, when heated on a water bath, gives a reddish violet. It gives no precipitate with ordinary alkaloidal reagents. It gives no precipitates with the salts of the heavy metals. It melts at 190° C., forming a dark-yellow liquid, and at a few degrees higher it decomposes, forming very irritating fumes. That it is a glucoside is proved by its readily reducing an alkaline solution of copper. The impure aqueous solution of the ether residue gives precipitates with alkaloidal reagents. His work shows that no alkaloid was found, and that it is probable that the glucoside mixed with impurities has been mistaken for an alkaloid.

The total amount dissolved with 95 per cent. alcohol is 11.12 per cent., nearly all of which is soluble in water. The water solution gave the following reactions:

Solution of ferric chloride, inky green precipitate.

Solution of lead acetate, golden yellow precipitate.

Solution of copper acetate, dirty yellow precipitate.

Solution of gelatin, white precipitate (slight).

Solution of molybdate of ammonium, a red color.

Solution of ferrocyanide of potassium, with ammonium hydrate, a deep red color.

SUMMARY.

| | Per Cent. | Per Cent. |
|---|---|---|
| Ash | | 4.00 |
| Moisture | | 8.00 |
| Petroleum ether extract— | | |
| (*a*) Volatile oil | 2.22 | |
| (*b*) Wax and fat | 3.24 | |
| (*c*) Fluorescent principle and caoutchouc-like body, small amount | | 5.65 |
| Ethereal solution— | | |
| (*a*) Fluorescent principle (impure) | .6 | |
| (*b*) Light-colored resin | 2.5 | |
| (*c*) Neutral principle and chlorophyll | .14 | |
| (*d*) Undetermined substances | .7 | 3.94 |
| Alcoholic solution— | | |
| (*a*) Orange acids (tannin) | .78 | |
| (*b*) Phlobaphene | 3.12 | |
| (*c*) Undetermined substances (resin, fluorescent principle) | 7.22 | 11.12 |
| Aqueous solution— | | |
| (*a*) Dextrin | 1.8 | |
| (*b*) Organic acids and allied substances | 7 | 8.8 |
| Dilute potash solution— | | |
| (*a*) Mucilage | 1.55 | |
| (*b*) Albumen | 3.88 | |
| (*c*) Undetermined substances | 5.07 | 10.50 |
| Intercellular tissue, as cellulose and lignin | | 45.04 |
| Loss | | 3.96 |
| Total | | 100.00 |

The fluorescent glucoside seems to be the bitter principle of the drug, and deserves further study.—Am. Jour. Pharm., 1891, 432–437.

*Hyoscyamus niger*, Linné—*The Alkaloidal Value of Some Commercial Henbanes.*—Mr. A. W. Gerrard has examined some French and German henbanes, and compared them as to alkaloidal value with ordinary English varieties. The following table gives the results of the examination in parts per 1000:

| Whence Obtained. | Part Used. | Yield of Alkaloids from 1000 parts. |
|---|---|---|
| Germany | Entire annual herb. | .295 |
| France | First year's biennial leaf. | .398 |
| England | First year's biennial leaf. | .390 |
| England | Second year's biennial leaf. | .451 |

The German variety had an unusual amount of stem present; therefore the results were low. Mr. Gerrard does not suppose or even suggest that this quality of henbane is the kind in common use in Germany.

*Nicotiana Tabacum—Alkaloid Pre-formed in the Leaves.*—According to W. Schuette, the leaves contain only traces of a mydriatic alkaloid.—Am. Jour. Pharm., 1891, 603, from Archiv, 1891, 528.

*Nicotiana Tabacum—Constituents of Ash.*—J. M. Van Bemmelen has analyzed the ash of tobacco from Java, Mexico, Japan, Hungary and Virginia.

The leaves of the best quality contain 12 to 15 per cent. of mineral matter (silica excluded), not much chlorine and sulphuric acid, no soda, or very little, and much potash, lime, and magnesia in combination with organic acids. In the ash not only the relation between the carbonates and the chlorides and sulphates is high (not under 7), but also the relation

$$(CO_2 : Cl\text{–}SO_3.)$$

between the potash and chlorides and sulphates ($K : Cl\text{–}SO_3$) is not under 2.—Yearbook Pharm., 1891, 175, from Landw. Vers.-Stat., xxvii., 409–436.

*Nicotiana—Climatic Conditions for the Development of Nicotine.*—According to extended experiments by A. Mayer, it appears that the percentage of nicotine is increased by the use of a rich and easily assimilable nitrogenous manure, a higher temperature, full lighting, a small supply of water (an excess is inimical), and an increase of the moisture of the atmosphere surrounding the plant, whereby transpiration is diminished.—Jour. Chem. Soc., July 1891, 858, from Landw. Vers.-Stat., xxxviii., 453–467.

*Nicotine—Products of the Reaction with Benzoic Chloride.*—By A. Pinner and R. Wolffenstein.—Jour. Chem. Soc., Aug. 1891, 945, from Ber., xxiv., 1373–1377.

*Nicotine.*—A. Pinner and R. Wolffenstein (Ber., xxiv., 1373–1377,) have obtained a compound agreeing with the results stated by Will (Annalen, 118, 206).—Jour. of Chem. Soc., 1891, 945.

*Nicotine.*—According to A. Pinner and R. Wolffenstein, when nicotine is mixed with platinum sponge and such a quantity of hydrogen peroxide that three atoms of active oxygen are present for each molecule of the base, and the whole allowed to remain for several weeks, the nicotine odor completely disappears. After this time the mixture is found to contain a new base answering to the formula $C_{10}H_{12}N_2O$, which is formed from nicotine by the substitution of one atom of oxygen for two atoms of hydrogen, and may be termed "oxynicotine." It is not volatile in a current of steam, is scarcely acted upon by aqueous potash, and by potassium permanganate is oxidized to nicotinic acid.—Yearbook Pharm., 1891, 47; from Ber., xxiv., 61–67.

*Nicotine—Reactions.*—For an explanation of the Roman numerals see under Chemistry.

B. P. 247° C. $C_{10}H_{14}N_2$. Spec. Grav. at 15° C. 1.014.

*a*. Miscible with water, alcohol and ether in all proportions.

*b*. Nicotine reminds one only faintly of tobacco, and burns readily with a very sooty flame.

*c*. Aqueous nicotine solutions (15 drops to 30 c. c. of water) react decidedly upon litmus and phenolphthalein and also blacken mercurous chloride. Vapors of nicotine when brought near vapors of hydrochloric acid readily form clouds of nicotine hydrochloride, similarly to ammonia and hydrochloric acid.

*d*. Nicotine solutions also precipitate the respective hydroxides from solutions of alum, ferric chloride and cupric sulphate.

*e*. If treated as described under coniine, in experiment *d*, nicotine will not form any crystals, nor will it if treated as mentioned in experiment *l*, thus differing from coniine, which in general it much resembles.

*f*. Placed in contact with sulphur or carbon bisulphide, nicotine will not cause any reactions for sulphides or thiosulphates, as coniine will (which see).

*g*. Nicotine solutions are not rendered cloudy by chlorine water, nor by reagents XI. or XVI., but become cloudy upon addition of reagents IV., V. or VI.

*h*. Reagent X. does not affect nicotine solutions (difference from coniine), but reagents VII., VIII., IX., XVII. and XVIII. form beautiful, generally crystalline, precipitates when added to nicotine solutions.—Phar. Review, 1892, 48.

*Intoxication Following the External Use of Tobacco.*—M. Auché, Jour. de Méd. de Bordeaux, cites the case of a man suffering from pediculi pubis who boiled 200 gm. of tobacco in 2 liters of water and rubbed it over his whole body, leaving it to dry on the skin. He was suddenly seized with vertigo, nausea, heaviness of the head, obnubilation of sight, cold sweats, extreme pallor, trembling and weakness of the limbs, etc. The extremities became very cold and purplish in color, and the moisture on the skin was viscous. The man's brain "felt compressed" and the air "looked foggy" to him. His pupils were slightly dilated, and retained the power of accommodation; they reacted to light; nausea and vertigo were constant symptoms. Patient complained of difficult respiration, and spoke with difficulty. A syncopal condition was constantly threatened. Reflexes and sensibility normal. These symptoms continued for three hours, when they gradually subsided. On the next day the man had a violent cephalalgia. (Nouv. Rem., July 8.)—Am. Jour. Pharm., Sept. 1891, 463–464.

*Influence of Tobacco on Healthy Persons.*—J. Ydan Pouchkine (Wratch, No. 48, 1890,) arrived at the following conclusions on the action of tobacco, after experimenting with seven non-smokers. The latter smoked twenty-five cigarettes every day for three days. (1) Tobacco increases

the quantity of the gastric juice, but reduces its acidity; (2) it reduces the quantity of hydrochloric acid in the gastric juice; (3) as the quantity of free hydrochloric acid is diminished so is the digestive force of the gastric juice reduced; (4) it retards the action of the rennet ferment; (5) the modification of the gastric juice produced by tobacco lasts for some time; (6) the mobility of the stomach and its resorbent power are augmented under the influence of tobacco; (7) it has no effect upon the acidity of the urine.—Bull. de Thérapeut., 1891, cxx., p. viii.; Am. Jour. Pharm., 1891, 557.

*The Different Scopola Species and their Different Applications.*—By B. Reber.—(Pharm. Post, 1892, 153–155.)

*More About Scopola.*—The editor of the Chem. and Drug. (1892, 771, 772,) reviews the history of Scopola and the work of Prof. Schmidt.

*Scopolia luridus*, Duval (*Anisodus luridus*)—*Alkaloid Pre-formed in the Root, Leaves, and Seeds.*—According to W. Schuette this plant contains only hyoscyamine pre-formed.—Am. Jour. Pharm., 1891, 603; from Arch., 1891, 529.

*Scopolamine.*—E. Schmidt separated some time ago a crystalline substance from the root of Scopolia atropoides, which was supposed to be crystallized hyoscine, but which on further investigation proves to be a new alkaloid, which he has provisionally named "scopolamine," having the formula $C_{17}H_{21}NO_4$; it contains two atoms oxygen more than apoatropine and atropamine; by boiling with baryta it yields tropic acid and a base having the formula $C_8H_{13}NO_2$, and melting at 110°. The commercial hyoscine hydrobromate consists essentially of scopolamine hydrobromate. Scopolamine has been found in small quantity in belladonna and in stramonium, and in some specimens of the leaves of Duboisia the mydriatic alkaloid was found to be largely this alkaloid, while in other specimens largely hyoscyamine was found.—Am. Jour. Pharm., 1891, 540; from Apoth. Zeitg., 1891, 522.

—— E. Schmidt has continued his investigations and brought forward a large mass of corroborative experiments, which prove that scopolamine is the pure form of an impure base, hitherto regarded as hyoscine, and that the commercial salts of hyoscine are essentially scopolamine salts of varying degrees of purity. As to the composition, the author finds that his combustion figures better suit $C_{17}H_{21}NO_4.H_2O$ than $C_{17}H_{23}NO_3$. By exposing the crystals in vacuo over sulphuric acid they lost in weight, and changed to an amorphous, colorless mass, which would prove that the molecule of water is essential for crystallization. R. Kobert undertook the physiological experiments with it, hyoscine and atropine, and found that there is no essential difference between the action of scopolamine and hyoscine, except that the latter is not quite so powerful as the former. The author then describes how scopolamine may be isolated from commercial

hyoscine hydrobromide, and the preparation of other salts. Nitrous acid acts on scopolamine, producing scopoline, $C_8H_{13}NO_2$; this derivative is also produced along with atropic acid by the action of barium hydrate, and the author advances the theory that scopoline may be identical with *pseudotropine*.

It will be noticed that scopolamine is isomer with cocaine.—Chem. Drug., May 1892, 771, from Archiv Pharm:, 1892, ccxxx., 207–231.

*Solanine—Sedative.*—Desnos recommends the administration of solanine to persons addicted to the morphine habit in place of morphine when a sedative is required.—Am. Drug., 1892, 131.

*Solanum rostratum—Analysis of.*—By W. S. Amos (Notes on New Remedies, Aug. 1891, 13, 14). Suggesting a new narcotic alkaloid.

*Solanum Lycopersicum*, L.—Under the title of "Chemical Composition of the Fruit of Tomatoes" is an exhaustive analysis by G. Brissi, T. Gigli and W. Passerini, of the tomato fruit. The pulp forms 85.4 per cent. of the whole fruit; it contains total dry matter, 4.725; soluble substance, 3.735; and insoluble matter, 1.093 per cent.—Jour. Chem. Society, Aug. 1891, 955, 956; Am. Jour. Pharm., 1891, 548, 549.

*Examination for Adulterations of Tomato Preserves.*—Capdeville (Bull. de Thérapeut., 1891, cxx., p. 277,) divides the analysis into an optical or microscopical and a chemical portion. The adulterations which are looked for by the first method are carrot and pumpkin, and this is done by comparison with sections of these vegetables. The chemical method takes cognizance of the presence of coloring matters such as eosin, cochineal and grenadin. *For eosin:* 5 gm. of the preserve are treated in a test tube with a mixture of 25 c.c. of distilled water, 1 c.c. ammonia, and 25 c.c. amylic alcohol. The mixture is then filtered, and in case the filtrate is rose-colored eosin is present, which is also shown by the fluorescence. *For cochineal:* 5 gm. preserve are treated for 24 hours with 30 c.c. alcohol of 95 per cent.; the liquid is then filtered and the alcohol evaporated on a water-bath. Should this residue on treatment with ammonia give a red color, cochineal is present. *For grenadin:* The preserve is treated with alcohol, the solution filtered and the filtrate evaporated to dryness. The residue is treated with water which dissolves the grenadin, and this aqueous solution is used for dyeing silk. Hydrochloric acid does not, while a solution of chloride of lime does, decompose the silk even at ordinary temperatures.—Am. Jour. Pharm., 1891, 557.

## STERCULIACEÆ.

*Cacao-butter—Iodine Number.*—F. Filsinger gives the following mean iodine numbers for cacaos of various origins: Arriba, I., 35.1; Arriba, II., 36.8; Carracas, I., 34.4; Carupano, 35.2; Ceylon, 35.9; Machala Guayaquil, 33.4; Puerto Cabello, 34.1; Surinam, 34.0; St. Thome, 33.5; Trini-

dad, 34.5; Kauka, Bahia and Puerto Plata cacaos range between 34.0 and 37.5.—Jour. Chem. Soc., July 1891, 869; from Chem. Zeitg., xiv., 716.

*Kola-nut.*—Monavon and Perrond have made comparative physiological experiments (Lyon méd., 1891, No. 46), which lead them to the conclusion that caffeine is not the only tissue-economizing principle present, but that other compounds of kola-nut likewise diminish tissue-waste. In this direction is the action of kola red, although it has only a slight effect upon the elimination of nitrogen compounds and phosphates. The extract of kola has the same effect as the powder.—Am. Jour. Pharm., 1892, 79.

*Kola-nut.*—An analysis by Heckel and Schlagdenhauffen was published in the American Journal of Pharmacy, 1884, page 170. It was at first thought that the medicinal effect depended entirely upon the presence of caffeine, although Heckel found that the residue, after extracting with chloroform, still had considerable action, and that the red coloring matter by heating gave a sublimate of caffeine, which it was thought was prevented from being extracted by some resinous matter. Dr. E. Knebel in taking up this subject finds that the red coloring matter contains a glucoside, for which the name *Kolanin* is proposed, and which by heating with water or dilute acid decomposes into caffeine, glucose, and Kola-red; it therefore follows that in the above analysis only the free caffeine was determined, whilst that present in combination was put down along with the coloring matter. It is very probable that the unripe or ripe seed contains only the glucoside, which by ripening or drying is decomposed largely into the several constituents by a ferment, which was isolated and found to have diastasic action upon starch; the fresh seed not being obtainable this could not be verified by an examination, but attention is called to the almost molecular proportions in which the caffeine and glucose are found in the dry seed; African explorers have repeatedly stated that the fresh seed upon mastication has at first a bitter taste, soon changing to sweet. *Kola-red* free from glucoside was prepared, and by analysis was found to have the formula $C_{14}H_{13}(OH)_5$; it is very unstable, and very probably by oxidation forms the tannic acid found in the seed.—Apotheker Ztg., 1892, 112; Am. Jour. Pharm., 1892, 230–231.

*Physiological Action of Kola Nut.*—Drs. Monavon and Perroud (Lyon Médical, Nov. 15, 1891,) from experiments on dogs draw the following conclusions as to the physiological action of kola nut and its constituents: (1) Kola nut is rather an anuretic than a diuretic. (2) The elimination of nitrogenous bodies and phosphates is diminished under the influence of kola nut. (3) The extract has the same action as the powdered nut. (4) Kola red has a slightly marked action on the elimination of nitrogenous bodies or of phosphates; it is similar to that of the powdered nut. (5) Caffeine has an action analogous to that of the powdered kola, but is inferior to this. (6) Kola can be regarded as a moderator of denutrition.—Am. Jour. Pharm., 1892, 230–231.

*The Kola Nut.*—Dr. Blanc makes the kola nut the subject of a lengthy but interesting communication to the Revue de Thér.—Abstract in Pharm. Record, 1892, 411, 412.

*Kola—Its History, Character and Properties.*—Notes on New Remedies, June, 1891, 6, 7; 10, 11.

STYRACEÆ.

*Benzoin, The Varieties of.*—An account of the cultivation and collection of benzoin in Sumatra by Mr. L. M. Vonck, published in the Journal of the Netherlands Society for the Advancement of Industry.—Chem. and Drug., 1891, 486–488; also Drug. Circ. and Chem. Gaz., 1891, 258.

*Benzoin—Tests for Purity.*—H. Beckurts and W. Brueche confirm the statement that Siam benzoin contains no cinnamic acid, which is present in Sumatra benzoin, at least generally. They found the specific gravity from 1.120 to 1.171; ash from 0.05 to 2.38 per cent.; portion insoluble in alcohol from 2.1 to 9.0 per cent.; acid number from 92 to 167; ester number from 39 to 71; saponification number from 160 to 211; iodine number from 55 to 90. Benzoin is rapidly tested for cinnamic acid by heating a small quantity with a little soda and water and warming the filtrate with potassium permanganate, with odor of bitter almonds.—Archiv. Pharm., 1892, ccxxx., 86.

TERNSIRŒMIACEÆ.

*Camellia Thea*, Link.—"Examination of Chinese Tea." In an article published in the Berichte, 24, 1945–1955; reprinted from Jour. Chem. Soc., 1891, 1302, P. Dvorkovitch criticizes the methods of Peligot, Mulder and Zöller for the estimation of theine in tea, and, regarding them as unsatisfactory, has devised the following process, which is said to be both rapid and exact: Ten grams of the finely powdered tea is treated with three successive quantities of 200 c.c. of boiling water, five minutes being allowed for each digestion, and then boiled with two successive quantities of 200 c.c. of water, or more, if necessary, until the last extract is almost, if not quite, free from color. The extracts are made up to a litre, and extracted thrice with light petroleum to remove oil, etc.; 600 c.c. of the washed solution is then shaken with 100 c.c. of baryta-water containing 4 grams of baryta in solution, filtered, and 583 c.c. of the filtrate (corresponding with 5 grams of tea) mixed with 100 c.c. of salt solution (20 grams of salt in 100 c.c. of water), and thrice extracted with chloroform. The extraction is best effected by shaking successive small quantities of the solution with chloroform, since nothing further can be extracted from the solution after the third shaking under these conditions, and not more than 400 grams of chloroform is required. After removal of the chloroform, by distillation to a small bulk and subsequent evaporation in a small dish and drying at 100°, the theine is obtained in perfectly white needles.

With the object of estimating not only the tannin but also the decomposition products formed from it during fermentation, Dr. Dvorkovitch has improved Löwenthal's method of oxidation with potassium permanganate in presence of indigo carmine.

With regard to the comparative values of teas, the author states that the higher the proportion of theine to the total amount of tannin and fermentation products, the more valuable is the tea. The analyses of teas of the first crop of 1890 are quoted in the paper, and the following results given: Water, 7.44–9.78; theine, 2.14–3.45; tannin, 8.84–10.55; fermentation products, 0.90–1.88; extractive matter, 30.70–34.95.

*Assam Tea—Presence of Saponin-like Substances.*—W. G. Boorsma has found two saponin-like subtances in the seeds of Assam tea, which he has named respectively: Assamic acid and Assamin.

*Assamic acid* is obtained by first removing the fixed oil (about 20 per cent.), and then extracting the seeds with water. The aqueous extraction is precipitated with 95 per cent. alcohol, the gelatinous mass extracted with 45 per cent. alcohol, the alcohol evaporated, and the residue dissolved in water. One-half of the solution is precipitated with subacetate of lead, and the other with the neutral acetate of lead. After removing the lead with sulphuric acid, the last precipitate is dissolved in alcohol, and chloroform and ether added. Two kgm. of seeds yielded 3 gm. of assamic acid.

*Assamin* is obtained from the first precipitate by dissolving it in alcohol and precipitating with ether.

The aqueous solution of both of them foams strongly; both precipitate albumen, but with this difference, that assamin precipitates it very little in the absence of acid, and only partially in the presence; assamic acid, on the contrary, precipitates it with and without acid. The aqueous solution of assamic acid has a distinctly acid reaction, and is precipitated by acetate and subacetate of lead. The aqueous solution of assamin has only a faintly acid reaction, and is not precipitated by acetate of lead, but only by the subacetate. Concentrated sulphuric acid dissolves assamic acid with an orange color, which gradually turns red and finally blue-violet. Fuming nitric acid dissolves it with a permanent yellow color, which on the addition of potassium bichromate is altered to green The solution is not precipitated by the ordinary alkaloid reagents; soda and potassa and also ammonia color the solution yellow. Fehling's solution produces a green color, and on boiling but little cuprous oxide is separated. The formula of assamin is $C_{18}H_{28}O_{10}$, agreeing with the general formula of Kobert, $C_nH_{2n-8}O_{10}$. On boiling with diluted hydrochloric acid, assamin is split into glucose, sapogenin, and probably a volatile body. The sapogenin consists of two bodies, one soluble in chloroform and the other insoluble. Assamin behaves in the main similar to assamic acid toward reagents.—

Apoth.-Zeitg. (Rep.), 1891, 118, 366; from Inaug.-dissert., Utrecht, 1891, after Rép. de Pharm., 118, 1891; Jour. Pharm. Chim., 1892, 400, 401.

*Tea—Assay.*—A. Domergue and Cl. Nicolas have devised an easier and more rapid method of estimating the theine, than those hitherto employed.

Five gm. of coarsely-powdered black tea are boiled for a few minutes with 50–60 c.c. of water, 100 c.c. of a 3 per cent. solution of mercuric acetate added, and again boiled, when the whole is thrown on a filter, and the residue washed with boiling water until the latter runs through colorless. The filtrate (about 300 c.c.) is evaporated on a water-bath to 20–25 c.c., and mixed with 2 gm. of calcined magnesia and 15 gm. of powdered glass, or well washed sand. After completely drying the mixture on a water-bath, it is exhausted in a Soxhlet apparatus with a mixture of equal weights of benzol and chloroform. On evaporation the theine will be obtained in an amorphous condition, of a white color, and contaminated with a very small proportion of waxy matter. The authors arrive at the following conclusions: (1) In black teas the percentage of theine is somewhat proportional to the price, though not exactly so. (2) The ash may amount to 6 per cent., and at times a little higher. The color of the ash should be green at first, and then quickly turn pink, before it becomes colorless. (3) The amount of moisture is between 8.76 and 11.76 per cent., averaging 10 per cent. (4) The amount of water-soluble substances is very variable, and generally will be found between 29.35 and 55.73 per cent. From the behavior of the ash of good tea, and of that of already extracted tea, the authors draw the conclusion that tea leaves contain the manganese in a soluble form. The ash of already extracted leaves is gray, and does not color boiling water. If a sample of black tea contains less than two per cent. of theine; if the color of the ash is not green, does not color boiling water; and if the quantity of water-insoluble substances of the ash is as large or larger than that of the water-soluble, the tea is of poor quality.—Chem. Zeitg., Rep., 1892, 126, from Journ. Pharm. Chim., 1892, 302.

——— *Estimation of Tannin.*—P. Maltscheffsky proceeds as follows: The tannin is precipitated by means of copper acetate, and the excess of copper titrated with potassium ferrocyanide solution. The copper solution contains 7.657 gm. of cupric oxide per litre (1 c.c.–0.01 gm. tannin), and the strength is verified by evaporating a measured volume to dryness, moistening the residue with nitric acid, heating to redness, and weighing the oxide. The ferrocyanide solution is prepared by making up 100 c.c. of a saturated solution to one litre. This is standardized by adding 1 c.c. at a time to 5 c.c. of the copper solution, diluted to 100 c.c., until a drop of the mixed liquids gives a blue color with a solution of ferric chloride (1 : 100). A second or third assay, if necessary, is made, adding the ferrocyanide solution by $\frac{1}{10}$ c.c. at a time, so as to get the exact titre.

Two gm. of tea, dried at 100°–107° C., are extracted four successive times with 100 c.c. of boiling water; the filtrates united, and made up to 400 c.c.; 100 c.c. of this liquid is boiled and treated with 10 c.c. of the copper solution. The precipitate is collected on a filter, and washed with hot water, and the filtrate and washings made up to 200 c.c., half of which is used for the approximate determination of the excess of copper, and the other half used for the exact determination. In 14 samples the tannin varied from 6.10 to 11.08 per cent.; the water from 5.59 to 12.48 per cent.; the ash from 3.14 to 9.25 per cent.; the theine from 1.09 to 2.88 per cent.; and the aqueous extract from 17.3 to 39.4 per cent.—Yearbook Pharm., 1891, 133; from Jour. Pharm. Chim., xxii., 270.

*A Pekoe Ceylon Tea—Analysis of.*—By Jos. F. Geisler.—Jour. Am. Chem. Soc., 1891, 237, 238.

*Theophylline—A New Alkaloid in Tea.*—By A. Kossel (Zeitschr. für physiol. Chem., 13, 298–308).—Berichte, 1891, 24, 327.

*Tea—In Tablets.*—This is made from the finest tea dust, packed dry with a pressure of two tons per tablet of two ounces and a half. A much inferior compressed tea, "log tea," consists of leaves and stalks, and is packed in the shape of logs, which weigh from 8 to 80 pounds. This tea is wrapped in the leaves of *Bambusa latifolia*, and bound with lengths of split bamboo.—Am. Drug., July 1891, 220.

### TILIACEÆ.

*Oil of Linden Seed.*—According to C. Mueller (Ann. agronom., xvii., 431), the seeds of the European lindens (Tilia platyphylla, ulmifolia and intermedia) contain, besides little starch, about 58 per cent. of a yellow bland non-dyring oil, which does not solidify at —21.5° C., does not become rancid, and resembles an excellent quality of olive oil. Sulphuric acid causes a dark brown red color, and a considerable rise of temperature.—Am. Jour. Pharm., 1892, 138.

### UMBELLIFERÆ.

*Ammoniacum—Tests for Purity.*—The behavior to hydrochloric acid, to alcohol, the specific gravity and the ash, together with the usual physical properties, suffice for the determination of its purity. H. Beckurts and W. Brueche found the specific gravity to be from 1.190 to 1.214; ash from 0.79 to 4.47 per cent.; soluble in alcohol from 56 to 68 per cent.; acid number from 64 to 80; ester number from 19 to 46; saponification number from 97 to 114.—Archiv Pharm., 1892, ccxxx., 93.

*Oil of Anise Bark.*—This oil is distilled from a bark, imported from Madagascar, probably the bark of Illicium parviflorum. The yield is 3½ per cent.; the odor reminds one of safrol and estragon (tarragon); the specific gravity is 0.969 at 15° C., and the rotatory power is $[a]_D = -0°.46$.

The oil consists, besides a very small quantity of anethol, of the isomer liquid anethol (Eijkman's methyl-chavikol). Schimmel & Co.—Pharm. Zeitg., 1892, 224.

*Volatile Oil of Asafœtida.*—F. W. Semmler (*Ber. d. D. Chem. Ges.*, 1891, 78) found in the above (1) two terpenes; (2) an oxygenated body $(C_{10}H_{16}O)_n$ yielding a sesquiterpene $C_{15}H_{24}$, on treatment with sodium; (3) the disulphides $C_7H_{14}S_2$, and (4) $C_{11}H_{20}S_2$. With zinc dust these yield the respective monosulphides. Allyl sulphide is not present in the oil of asafœtida.—Am. Jour. Pharm., July 1891, 340–341.

*Carum Gairdneri, B. and H.*—This is known as Yamp and Yampah, Yep or Yepah. It is a food plant found in Wyoming, extending through the Rocky Mountains to Oregon and Washington; southward it extends to Utah, Nevada and Southern California. The tuberous roots, according to Dr. Havard, are in close clusters of 2 to 5, fusiform or conical, about an inch long and half an inch or less thick; they are covered with very thin brownish skin, which, when scraped off, leaves an homogeneous, pure white, farinaceous substance. Eaten raw they have a delicious aromatic flavor, without any bitterness or astringency and with the blended taste of the nut and the parsnip. Among the Indians this is considered one of the very best of the native esculent roots, either raw or cooked. Another species of Carum (C. Kellogii, Gray) is found in Central California. The roots are likewise tuberous and clustered, probably larger, and used as food by the Indians. The tubers after being dried were submitted to a proximate analysis by Prof. Trimble, with the following results:

| | Per cent. |
|---|---|
| Fat, wax and caoutchouc | 1.03 |
| Resin soluble in stronger ether | .53 |
| Saccharose | 10.98 |
| Glucose | 5.32 |
| Mucilage and albuminoids | 29.20 |
| Pararabin, etc. | 2.75 |
| Starch | 5.35 |
| Moisture | 14.66 |
| Ash | 3.62 |
| Insoluble and undetermined | 26.56 |
| | 100.00 |

This food is remarkable for the large proportion of cane sugar it contains. The alcoholic extract deposited clear white crystals of it on standing.—Am. Jour. Pharm., 1891, 525–527.

*Preparation of Carvacrol.*—A. Reychler reports (Bull. Soc. Chim. [3], vii., 31,) having received 90 per cent. of the theoretical quantity of carvacrol by operating as follows: Mix carvol chlorhydrate with not over 2 per cent. of anhydrous zinc chloride, and for the purpose of avoiding too

energetic action, add about 30 per cent. of glacial acetic acid; heat the mixture in a flask connected with a reversed condenser. At 95° C. hydrogen chloride begins to be evolved, and it ceases near 120°. Most of the acetic acid may be recovered by crystallization; the remainder is removed with water, together with the zinc chloride; the carvacrol is separated by distillation.—Am. Jour. Phar., 1892, 228.

*Celery Seed—Contamination.*—"Chemist & Druggist" notice a case of poisoning by celery seed, which, on investigation, turned out to be chiefly hyoscyamus seed, the proportion of genuine celery seed in the stock of the grocer varying from 0.005 to 10 per cent.—Chem. Drug., May 1892, 773.

*Cicuta maculata*, Linné.—By Robt. Glenk. (Am. Jour. Pharm., 1891, 328–332.) Under the microscope the root consists of a thick bark with numerous resin cells, the meditullium is free from wood fibres. The medullary rays of the stem are slender and of the same size as the wood wedges.

The tissue of the albumen of the seed contains a colorless fixed oil in drops, and also transparent colorless grains. The vittæ are filled with a yellowish-brown essential oil, and extend the whole length of the fruit. He obtained from the fruit collected in August, September and October, a volatile oil of sp. grav. .855; boiling point 177° C., soluble in 1½ parts of chloroform, in all proportions of absolute alcohol, and in 50 parts of glacial acetic acid. The following color reactions were observed: a solution of bromine in chloroform (1–20) gives a brownish color; a strong alcoholic solution of HCl colors a reddish violet; $H_2SO_4$ conc. (6 drops to 1 of oil) immediately dark brown; fuming $HNO_3$ on a solution of the oil in $CS_2$, gives a brownish tint; solid iodine added to the oil dissolves slowly; picric acid on warming dissolves with an orange color. He also obtained by distillation a volatile alkaloid which forms heavy white fumes on bringing a rod moistened with HCl in contact with the vapor. On the addition of conc. $H_2SO_4$, a reddish color is produced. The aqueous solution reduces mercuric chloride and silver nitrate. Neutral acetate of lead produces a white precipitate; ammoniacal copper sulphate, bluish white; platinic chloride, yellowish-red; potassio-mercuric iodide, grayish-white; gold chloride, yellowish-white; tannin or picric acid give no precipitates with the aqueous solution, and ferric chloride is merely darkened in color. Whether this alkaloid is identical with coniine could not be fully determined, owing to scarcity of material. It does not seem to be present in the root. The following is a tabular statement of the analysis made by Mr. Glenk:

| | | *Per Cent.* |
|---|---|---|
| Moisture | | 10.00 |
| Ash | | 6.00 |
| Petroleum Extract: | Volatile oil | 5.10 |
| | Fixed oil and chlorophyll | 16.10 |
| Ether Extract: | Resin sol. in alcohol | .98 |
| | Resin sol. in ether, chlorophyll | 1.14 |

| | | |
|---|---|---|
| Absolute Alcohol Extract: | Resin | .68 |
| | Extractive, etc., sol. in water, alkaloid. | 1.32 |
| Aqueous Extract: | Mucilage, etc. | 12.90 |
| | Glucose | 6.00 |
| | Malic acid, etc. | 2,70 |
| | Ash (CaO, $Al_2O_3$, MgO, $H_2SO_4$, Cl) | 4.00 |
| Dilute Soda: Pectin and albuminoids | | 3.20 |
| One per cent. HCl: Inorganic matter | | 2.00 |
| Chlorine water: Lignin, etc. | | 6.00 |
| $KClO_3$ and $HNO_3$: Incrusting matter | | 4.00 |
| Residue: Cellulose, etc. | | 17.00 |
| Loss | | .88 |
| | | 100.00 |

—Am. Jour. Pharm., July 1891, 328–332.

*Cicuta maculata*, Linné.—The roots of so-called "wild parsnip" were sent by Mr. C. J. C. Boyles, Du Bois, Pa., to Prof. Maisch, from which three children, who had eaten of them, died within three hours. He recognized it as Cicuta maculata. That this plant, and more particularly the root, is poisonous, is stated by most writers on American plants. Dr. Darlington (Flora Cestrica), Dr. W. P. C. Barton (Compend. Floræ Philadelphicæ), Dr. R. E. Griffith (Medical Botany). It seems that the fleshy character and agreeable odor and taste render this root particularly dangerous by mistaking it for others, which are edible and harmless.—Am. Jour. Pharm., July 1891, p. 323.

*Cicuta maculata*, Linné.—That the fruit of Cicuta maculata contains a volatile alkaloid, was shown by Jos. E. Young (Am. Jour. Pharm., 1855, p. 289), but whether it is identical with coniine or with the little known cicutine of Polex and Wittstein has not been satisfactorily demonstrated. Both investigators did not succeed in isolating from the root a similar alkaloid. Likewise in 1868, Van Ankrim did not succeed in obtaining from the root of the European species, Cicuta virosa, either a volatile alkaloid or a crystalline principle possessing the poisonous properties of this plant. The cicutoxin of R. Boehm and Trojanowski (1876–1877) is essentially the alcoholic extract of the ethereal extract of the root.—Am. Jour. Pharm., July 1891, 323–324.

*A New Alkaloid from Conium maculatum.*—E. Merck (Chem. Centrbl., 1891, I., 414) obtained a small quantity of a new alkaloid from the high boiling portion of crude coniine. The isolation was accomplished by fractional distillation in vacuo and recrystallization. The alkaloid crystallizes in needles, is easily soluble in alcohol, ether and chloroform, fuses at about 98° C., and boils at 230–232° C. According to Ladenburg, the alkaloid is is an isomer of conhydrine, having the formula $C_8H_{17}NO$, and for this reason the name *pseudo-conhydrine* was selected.—Am. Jour. Pharm., July 1891, 339.

*A New Alkaloid from Conium maculatum—Its Constitution, and Attempts to Synthesize It.*—By A. Ladenburg and G. Adam (Ber., 1891, 24, 1671–1676).—Jour. Soc. of Chem. Indus., 1891, 848, 849.

*Coniine—Reactions.*—For an explanation of the Roman numerals see under Chemistry.

M. P. 2.5°, spec. grav. 0.862, B. P. 166° C.

$$\begin{array}{l} CH_2—CH_2—NH \\ \,| \qquad\qquad\quad | \\ CH_2-CH_2—CH.C_3H_7. \end{array}$$

*a.* Coniine has a characteristic odor and taste, reminding somewhat of tobacco. It burns with a bluish light if introduced into the flame.

*b.* Coniine is soluble in acetone, ether and alcohol, but less readily so in benzene, chloroform and benzine. It forms a clear solution with 150 parts of water at 15° C., which, however, becomes cloudy when heated even in the slightest degree, the warmth of the hand often being sufficient to bring this about.

*c.* The aqueous solution of coniine turns litmus blue, and slightly affects phenolphthalein paper, due to the trace of ammonia that coniine invariably contains. This can also be shown by shaking coniine solutions with some mercurous chloride, when the latter will be turned dark brown or black.

*d.* Mix several drops of coniine with as much ether in a small dish, and cover with a piece of filter paper; place upon the latter a watch glass containing a few drops of reagent VI, and cover the entire arrangement with a beaker. Before long fine needle-shaped crystals of coniine hydrobromide will be deposited on the dish and watch glass; if dilute hydrochloric acid had been used instead of the bromine water, coniine hydrochloride would have been similarly formed and deposited instead.

*e.* If an aqueous solution of coniine or its salts be mixed with some magnesium carbonate or oxide, and shaken with carbon bisulphide, the latter will take on a yellow color.

*f.* Chlorine water and reagents IV., V., VI., VII., VIII., IX., X., XVII. and XVIII. cause cloudiness or dense precipitates to be formed in coniine solutions, while reagents XI. and XVI. have no effect.

*g.* Coniine solutions precipitate aluminium hydroxide and ferric hydroxide from solutions of alum or ferric chloride respectively. Even a solution of magnesium chloride is rendered slightly turbid, so basic is the alkaloid.

*h.* By adding a drop of solution of sulphate of copper to a coniine solution, a blue precipitate is formed and the solution becomes colorless or nearly so in proportion to the amount of ammonia in the coniine.

*i.* Aqueous solutions of coniine when shaken with carbon bisulphide impart to the latter a yellow color. The aqueous solution separated from the carbon bisulphide causes a brown coloration when added to a solution of cupric sulphate, a passing red-brown color to reagent XXI. and is rendered turbid by acetic and dilute acids in general. The reactions are due to the formation of thiosulphates and sulphides.

*j.* Two drops of coniine dropped upon two drops of carbon bisulphide cause heat to be generated, and water, after being shaken with the mixture, gives the reactions for thiosulphates mentioned under *i.*

*k.* 20 milligms. of sulphur when moistened and triturated with a few c.c. of coniine solution become reddish-yellow, and also give up the thiosulphate to water or alcohol when treated with the latter.

*l.* Shake together in a beaker 50 milligms. of fused calcium chloride with 1 c.c. of alcohol and 10 drops of coniine solution; as the alcohol evaporates, crystals of coniine hydrochloride will be formed upon the sides of the vessel.—Phar. Review, 1892, 28.

*Coniine—Forensic Detection.*—162 gms. of the stomach and contents were cut up finely, digested for some time with 95 per cent. alcohol and 10 drops of sulphuric acid, filtered, and washed with alcohol. The liquids were evaporated to one-third at 50° C. Light petroleum, benzene and chloroform, applied successively, failed to extract any alkaloidal substance; the liquid was made alkaline with soda and filtered, the precipitate being washed with a little alcohol. A portion of this solution was shaken with light petroleum; on subsequent evaporation with a drop of hydrochloric acid, a crystalline hydrochloride was left, which gave the usual reactions for coniine. Another portion was shaken, part of it with chloroform and part with ether. The hydrochloride from the chloroformic solution was administered hypodermically to a cat, showing the usual symptoms of coniine poisoning. From the ethereal solution microscopic, oily globules with the characteristic smell were obtained.—L. W. Andrews, Jour. Chem. Soc., July, 1891, 871; from Am. Chem. J., xiii., 123–128.

*Methylconiine—Preparation.*—M. Passon prepares it by adding a concentrated solution of potassium methyl sulphate (25 gm.) to a concentrated solution of coniine, and heating on a water-bath until the mixture reacts neutral. The unaltered coniine is separated by conversion into its nitroso-compound and extraction with ether; the solution is made alkaline and distilled, the base precipitated from the distillate with soda, dried over potash, and distilled. The pure base is a colorless oil, which floats on water, boils at 175.5° C., and has a coniine-like odor.—Jour. Chem. Soc., Sept. 1891, 1118, from Ber., xxiv., 1678–1682.

*Oil of Fennel—Chemistry.*—For the chemistry of its peculiar camphor, "fenchone" see two papers by O. Wallach, in Journ. Chem. Soc., Sept. 1891, 1082 and 1086, from Ber., xxiv., 1525–1579, and Annalen, cclxiii., 129–156.

*Galbanum—Test for Purity.*—H. Beckurts and W. Brueche found the spec. grav. from 1.109 to 1.133; ash from 4 to 8.7 per cent.; soluble in alcohol from 54 to 63 per cent.; acid number from 19 to 40; ester number from 63 to 91; saponification number from 82 to 115. The acid, ester and saponification numbers are sufficiently characteristic to serve as guide in the valuation.—Archiv Pharm., 1892, ccxxx., 92.

*Liquid Persian Galbanum.*—The occurrence in commerce in recent years of a liquid Persian galbanum in the form of a reddish-brown liquid of the consistence of Venice turpentine, has led Mr. E. M. Holmes to attempt to clear up the local and botanical origin of the different varieties of galbanum.

Galbanum is usually spoken of either as "Levant" or "Persian," the sorts termed "Persian" differing from the "Levant" in the possession of a turpentine odor in addition to that of galbanum. Mr. Holmes is of the opinion that all the varieties of galbanum of commerce under either name come through Persia. As to the botanical origin, so far as evidence is at present obtainable, it appears probable that "Levant" galbanum is yielded by *Ferula galbaniflua* and its variety *β-Aucheri*, and the solid "Persian" galbanum possibly by *Ferula Schair*, Borszcz., but the liquid Persian galbanum by a species nearly allied to *F. galbaniflua*, judging from the fruits found in it. It would appear also that the "*Ferula galbaniflua*" found by Dr. Aitchison in Afghanistan is not identical with the *Ferula galbaniflua* of Boissier, and that neither it nor *Ferula rubricaulis* yields galbanum.

Mr. Holmes has been able to prove, from the resin contained in this plant being different from ordinary galbanum, that it is not the source of the commercial drug. With it the whole subject of the origin of the liquid galbanum, of course, is involved, and he is led to the conclusion that the liquid Persian galbanum of commerce is derived from an undescribed species of *Ferula* allied to *F. galbaniflua*. In chemical characters, liquid Persian galbanum agrees closely with Levant galbanum, but differs markedly in odor, and the fruits found in it nearly approach those of *Ferula galbaniflua*, Boiss. *Ferula rubricaulis* Boiss. does not yield galbanum, but a gum resin of alliaceous taste and odor; nor does the *Ferula galbaniflua* of Aitchison afford galbanum.—Am. Journ. Pharm., 1891, 510; Am. Druggist, 1891, 299, from Pharm. Journ. Trans., Sept. 1891, 194; Drug. Circ., 1891, 225.

*Ligusticum Panul*, Bert.—A description of panul, with its medicinal uses.—Pharm. Jour. and Trans., 1892, 879.

*Ligusticum filicinum*, Watson.—In a paper read before the Pennsylvania Pharmaceutical Association in 1890, Prof. Maisch suggested that Colorado cough root was probably derived from a species of Ligusticum. In the Botanical Gazette, vol. 14, p. 278 (1889), is found the following: "Ligusticum filicinum, Watson, was collected in great abundance near Lake City, by E. J. Ebert in 1888, and in the mountains back of Denver, by John Kochan in July, 1889. This is the 'Osha' of the Indians, who use its very large aromatic roots." Mr. Ebert collected and identified the plant in 1888, as well as John Kochan, in 1889. The origin of Colorado cough root being established, another interesting question is opened as to the identity of this Colorado osha with the osha from New Mexico, de-

scribed by Wm. Procter, from specimens received from J. Krummeck, Santa Fé, N. M. (Am. Jour. Pharm., 1867, p. 202). From incomplete specimens Elias Durand (Ibid., 1868, p. 106) referred the probable origin of this root to Daucosma laciniata, now known as Dioscopleura laciniata. It was chemically examined by Herman Haupt (Ibid., 1873, p. 347). It is not unlikely that the Indian name osha may be used in different localities for different species having similar properties.—Am. Jour. Pharm., July 1891, 321–322.

*Seseli Harveyanum*, F. v. M.—*Australian Anise.*—The fruit is locally used in Australia under the name of anise. ("Notes on Australian Economic Botany," p. 135).—Pharm. Jour. and Trans., 1892, 817.

*Sium cicutæfolium*, Gmelin.—It is noteworthy that in a large number of works on descriptive and medical botany, Prof. Maisch found no allusion to the supposed poisonous properties of Sium cicutæfolium, or "water parsnip," except in Carter's Synopsis of the Med. Botany of the U. S. Dr. C. B. White, U. S. A., has recorded a case of poisoning by the root of this plant. (Am. Jour. Pharm., 1873, p. 371). It was analyzed by A. R. Porter and N. Rogers (Ibid., 1876, pp. 348 and 483); no poisonous principle could be detected, and the deleterious effects were ascribed as being possibly due to a resin.—Am. Jour. Pharm., July 1891, 324.

*Umbelliferous Fruits—The Powder of.*—By Prof. J. Moeller, in Innsbruck (Pharm. Post, 1892, 24–29). The article is illustrated with sections from anise, carum and fennel fruits.

*Wild Parsnip* (so-called)—*Review of Some Cases of Poisoning by.*—By Dr. Fred. B. Power. (Read before the Wisconsin State Med. Soc., June, 1891.)—Pharm. Rundschau, 1891, 162–165.

*Umbelliferæ—Structural Differences of the Roots.*—By Courchet and Girard.—Apoth.-Zeitg. (Rep.), 1891, 96, from Comptes rendus, xviii., 1020.

URTICACEÆ.

*Artocarpus incisa*, Linn.—*Analysis of the Fruit and its Milk-juice.*—According to Theodor Peckolt, the constituents of the fruit of this tree ("the bread-fruit tree") are as follows in 1,000 gm.:

Solid, yellow fat 3.880, albuminoids 21.100, saccharose 5.310, glucose 55.950, tartaric acid 4.030, citric acid 0.210, malic acid 0.320, pectinous substances 0.630, gum, etc., 32.450, ash 16.050, water 809.950.

100 gm. of the dried fruit contain 1.773 per cent. of nitrogen.

According to Godeffroy, the ash of the ripe fruit contains in per cent.:

Potassium carbonate 44.060, magnesium phosphate 10.007, magnesium carbonate 4.443, calcium carbonate 9.230, calcium sulphate 6.276, sodium carbonate 5.300, potassium chloride 16.004, alumina 0.271, ferric oxide 1.212, silicic acid 4.575, and traces of calcium chloride and manganic oxide.

The fruit is collected when perfectly developed but still green, and allowed to ripen spread on straw. They contain then 4.888 per cent. of starch, which on ripening disappears entirely, becoming transformed into glucose. Carbon bisulphide extracts from the unripe fruit 3.796 per cent. of caoutchouc. The small unripe fruit contains in 1,000 gm.:

Caoutchouc 4.631, wax 3.159, fat 0.261, "artocarp-papayotin" 0.600, soft resin 1.630, resin acid 2.900, sugar 2.045, nitrogenous extractive matter 7.746, organic acids, etc., 22.253, water 889.790.

*Artocarpine and Artocarp-papayotin.*—See these.—Pharm. Rundschau, N. Y., 1891, 220.

*Artocarpus integrifolia*, Linn.—*Analysis of the Fruit and the Milk Juice.*—Theodor Peckolt has analyzed the ripe fruit, and found it to vary in several respects from that of *A. incisa*, Linn. In 1000 gm. it contains: Soft resin 2.780, albuminoids 8.980, glucose 80.19, saccharose 17.960, pectinose 0.40, mucilage, acids, etc., 57.840, water 791.900, cellulose 39.950. 100 gm. of the dried fruit contain 0.621 per cent. of nitrogen.

The milk juice contains in 100 gm.: Artocarpin 4.209, artocarp-papayotin 1.110, resin 13.566, caoutchouc 13.314, extractive matter 1.135, water 66.666.—Pharm. Rundschau, N. Y., 1891, 221.

*Artocarpine.*—This substance, peculiar to several species of Artocarpus, is obtained from the milk juice of the "bread fruit" (fruit of *A. incisa* and *A. integrifolia*) by shaking the milk with four volumes of water and collecting the insoluble portion on a filter. This residue is dried, extracted with alcohol, and the insoluble residue heated to boiling with absolute alcohol, and filtered while hot. On cooling, artocarpine separates in crystalline flakes. Artocarpine is a crystalline resin, snow-white, without odor and taste. Heated on platinum foil, it burns without leaving a residue; it is insoluble in amyl alcohol, cold ethyl alcohol, ammonia and alkalies, easily soluble in ether, chloroform and boiling absolute alcohol.—Theodor Peckolt, Pharm. Rundschau, N. Y., 1891, 221.

*Cannabis sativa, Linné.*—In an article upon Cannabis Indica (Does it contain an alkaloid?), Mr. Henry F. Smith has briefly and thoroughly reviewed the literature concerning its chemical history. By the use of two distinct methods of treatment, quite different from those followed by previous investigators, he secured a principle identical in color, consistence, odor, solubilities, and gave the same alkaloidal tests as the so-called "cannabine" obtained in 1881 by Louis Siebold and T. Bradbury. (Pharm. Jour. Trans., 12, 326). From an ethereal solution which was evaporated to dryness on a water bath, there remained a yellowish-green, transparent varnish-like substance. It had a strong peculiar odor, resembling that of conine, still stronger on the application of heat, was soluble in ether, chloroform, alcohol and acidulated water, but only slightly so in water, was alkaline to test paper and capable of neutralizing acids. When dissolved

in very dilute $H_2SO_4$ (1 gtt. in 5 c.c.), it gave a clear yellow solution and the following reactions:

With Mayer's reagent, abundant white precipitate.

Solution picric acid, abundant yellow precipitate.

Solution $K_2Cr_2O_7$, yellowish-brown precipitate.

Solution NaOH, yellowish-green precipitate.

Solution KOH, yellowish-green precipitate.

Solution KI, yellowish precipitate.

Solution tannic acid, yellowish-brown precipitate.

This alkaloid yielded nitrogen and its salts from very dilute sulphuric acid, was white and crystalline in the form of long needle-shaped crystals. The yield of alkaloid was .01 per cent.—Am. Jour. Pharm., Aug. 1891, 386–391.

*Indian Hemp as an Intoxicant.*—(The Asclepiad, IX., 33–48).—Phar. Jour. and Trans., 1892, 1003.

*Cecropia hololeuca,* Miq.—*Analysis of the Root-bark.*—Theodor Peckolt states that the root-bark contains the following constituents in 1,000 gm.:

Fatty and waxy substances 0.640, soft resin 1.520, resin acid 1.850, cecropine 0.880, gallic acid 0.350, extractive matter, glucose, etc., 21.800, ash 20.500, water 625.000.

*Cecropine* is obtained by exhausting the root-bark with boiling absolute alcohol in the presence of lime, filtering hot, decolorized by charcoal, evaporating to crystallization, and dried over calcium chloride. It appears in small crystalline scales, of a bitter taste. It is but little soluble in cold water, easier in hot water, and still more so in acidulated water, also in ether, chloroform, benzin and alcohol, insoluble in petroleum ether. The aqueous solution has an alkaline reaction, and on the addition of ammonia becomes blue, fluorescing stronger than a solution of quinine sulphate. Auric and platinic chlorides produce a strong turbidity, and the other usual alkaloid-reagents precipitate it.—Pharm. Rundschau, N. Y., 1891, 290.

*Dorstenia multiformis—Analysis of the Root.*—Th. and Gust. Peckolt found in 1,000 gm. of the fresh root:

Essential oil, 0.161; wax, 0.897; aromatic resin, 0.656; fixed oil, 12.371, starch, 16.780; bitter principle, 0.565; extract, soluble in alcohol, 21.987; extract, insoluble in alcohol, 22.485; water, 526.800; ash, 12.200.—Pharm. Rundschau, N. Y., 1891, 291.

*Figs—California.*—In Pomona valley over 700 acres will be planted with imported Syria fig trees (about 73,000 trees).—Am. Drug., Aug. 1891, 260.

*Fig Wine—Characteristics.*—According to P. Carles, fig wine is largely made in Algeria by moistening figs with tepid water acidified with tartaric

acid, when fermentation rapidly sets in, yielding a wine of about 8° alcoholic strength and very free from acidity. If this wine is evaporated to a syrup, it will after 24 hours solidify to a crystalline mass, consisting chiefly of manitol, in the proportion of 6 to 8 gm. per litre, whilst in ordinary wines it does not exceed a few decigrams. As little as 25 per cent. of fig wine in ordinary wine can therefore be detected.—Journ. Chem. Soc., Sept. 1891, 1135, from Comptes rendus, cxii., 811.

*The Latex of Ficus Carica.*—By U. Mussi (L'Orosi, 14, 297–304).—Abstr. in Jour. Chem. Soc., 1892, 653.

*Humulus Lupulus*, Linné.—"The estimation of tannin in hops," by E. Kokosinsk.

The method depends on the property of tannin of absorbing iodine in presence of alkaline carbonates.

The solution is prepared by boiling 10 grams of hops, the solution being diluted to 500 c.c. If the hops have been sulphured, a few drops of hydrogen peroxide are added to the water before commencing to boil. The extract is filtered from the hops. The solutions required are: (1) normal solutions of sodium carbonate; (2) normal sulphuric acid; (3) $\frac{1}{10}$ N. iodine; (4) $\frac{4}{50}$ N. solution of sodium thiosulphate 9.920 gram in 1 litre; (5) a solution of pure tannin prepared from galls, which contains 0.05 gram tannin in 100 c.c.; (6) a freshly prepared solution of starch.

Three flasks of about 100 c.c. capacity are employed; into the first is put 10 c.c. of water, into the second 10 c.c. of tannin solution, into the third 10 c.c. of hop extract. To each flask 4 c.c. of the normal sodium carbonate solution is added, and immediately afterwards 20 c.c. of the standard iodine solution. Flasks 2 and 3 are then tested for free iodine by placing a drop of the solution on a piece of starch paper, and if free iodine is not present, more of the standard iodine must be added to each flask. The iodine is allowed to react for five minutes, then to each flask 4 c.c. of the normal sulphuric acid is added to neutralize the sodium carbonate, and 10 c.c. of the sodium thiosulphate solution is added to reduce the excess of iodine present. A few drops of starch paste are now added to each flask, and the excess of thiosulphate determined with the iodine solution. The number of c.c. of iodine required to titrate the thiosulphate in flask 1, represents the amount of iodine which has entered into combination with the sodium carbonate, the starch, and other errors which may be inherent to the titration; the amount of iodine used by flask 2 represents that absorbed by the solution of tannin = 0.005 gram plus the amount absorbed in the blank experiment; the iodine used by flask 3 represents that which was absorbed by the tannin of the hops *plus* the amount absorbed in the blank experiment. From these figures, the amount of tannin in the hops may be readily calculated.—Am. Jour. Phar., 1891, 490, 491; Chem. Centr., 1891, i., 377; from Jour. Chem. Society, July, p. 870.

*Maclura affinis*, Miq.—*Analysis of the Wood.*—Theodor Peckolt has analyzed the wood, and found in 1,000 gm.:

Alpha soft resin, 2.406; beta soft resin, 6.287; gamma resin, 11.127; resin acid, 6.400; morin, 44.360; maclurin, 56.240; bitter extractive matter, 26.074; lime salts, etc., 126.560; water, 124.854; ash, 33.750.—Pharm. Rundschau, N. Y., 1891, 291.

*Maclura aurantiaca*—*Analysis of the Leaves.*—These leaves, which have been recommended as a substitute for the leaves of the mulberry for feeding silkworms, according to A. Pizzi, have the following composition:

| Water. | Fat. | Proteids. | Non-proteid Nitrogen. Matter. | Crude Cellulose. | Carbohydrates. | Ash. |
|---|---|---|---|---|---|---|
| 65.71 | 0.64 | 4.78 | 3.23 | 9.52 | 12.68 | 3.42 |

The ash consists of:

$K_2O : Na_2O : MgO : CaO.Fe_2O_3.SiO_2.P_2O_5.SO_3.Cl.$ Loss, 9.24, 6.16, 6.73, 25.73, 3.81, 26.25, 17.54, 2.41, 1.33, 1.81.

Experiments with gastric juice show that in 100 parts of dry leaves there is 1.10 of nitrogen digested and 1.14 parts not digested, corresponding with 6.85 and 7.03 parts of proteids respectively.—Jour. Chem. Soc., Aug. 1891, 954, from Staz. Sper. Agrar., xviii., 589–596.

*Pharmacosycea Spec.* (*anthelmintica, radula, vermifuga*, Miq.)—The milk-juice of these South American Urticineae, according to Theo. Peckolt, although containing a large proportion of caoutchouc and being more or less caustic, is used by the natives as a sure vermifuge. The bark is made use of by some of the Indian tribes for clothing (shirts, girdles, etc.); for this purpose two circular incisions are made at the distance of the length of the garment, the bark loosened carefully so as not to break it, put to soak in water for some time, and then beaten with wet wooden mallets until only the fibre is left.—Pharm. Rundschau, N. Y., 1891, 165.

*Sahagunia Peckoltii*, Schum—*Analysis of the Fruit and the Seeds.*—Theodor Peckolt has found the recent fruit to contain in 1,000 gm.:

Fat, 9.710; soft resin, 1.610; albuminoids, 11.180; sugar, 91.460; extractive matter, 52.150; tartaric and citric acids, gum, etc., 24.360; inorganic salts, 16.620; water, 657.590. In 100 gm. of the dried fruit were found 0.624 per cent. of nitrogen.

The fresh seeds contain in 1,000 gm.:

Fixed oil, 9.750; resin, 22.930; albuminoids, 19.710; starch, 219.120; sugar, 14.680; extract, etc., 51.850; ash, 24.070; water, 462.280. 100 gm. of the dried seeds contain 0.586 per cent. of nitrogen.

The resin of the fruit is insoluble in ammonia and caustic alkalies, and easily soluble in ether, alcohol and chloroform. The resin from the seeds

is insoluble in ether and chloroform, but easily soluble in alcohol, ammonia and alkalies.—Pharm. Rundschau, N. Y., 1891, 220.

*Stachys tuberifera.*—The name "stachyose" was given to the crystalline carbohydrate obtained from the tubers of the plant by A. v. Planta and E. Schulze, and its composition expressed by the formula $C_{15}H_{32}O_{16}$ or a multiple of the same. Further investigation (Berichte, xxiv., 2705) shows that the products of inversion of stachyose with dilute sulphuric acid are galactose, grape sugar, and fruit sugar, the same glucoses as result from the inversion of raffinose (Pharm. Jour. (3), xxi., 719).—Pharm. Jour. and Trans., 1891, 269.

*Urostigma Spec.* (*Maximilianum, cystopodum, Kunthii,* Miq.)—The bark of these trees is much used by the Brazilians for blood-purifying drinks, especially that of *U. cystopodum*, the vernacular name of which is "azougue vegetal" (vegetable mercury); the Indian name is "mururu." The milk-juice of *U. hirsutum* is used for indolent ulcers, and also, as well as that of *U. atrox*, as an ingredient of the urari-poison.—Pharm. Rundschau, N. Y., 1891, 167.

*Urostigma Dolarium*, Miq.—The milk-juice of this tree, known to the Brazilians as *Cerejeira, Figueira branca, Gamelleira*, is in high repute with the natives as a remedy for tropical chlorosis, which is believed to be due to the presence of a worm (or parasite), an "ankylostomum." The dose is rather large—10 tablespoonfuls of the fresh milk-juice mixed with 20 tablespoonfuls of water, to be repeated the next day if required. Theo. Peckolt has analyzed the juice with the results noted below. It is snow-white, cream-like, of a sweetish taste, reminding of almond milk; it reddens strongly litmus paper, and has a sp. gr. of 1.042.

In 1,000 gm. of the juice were found: Wax 3.055, caoutchouc 111.121, soft resin 11.569, doliarin 56.948, urostigma-papayotin 16.579, bitter principle 2.063, glucose 40.990, albumen, organic acids, tannin, etc., 103.675, water 654.0. The bitter principle is a light-brown, hygroscopic powder of an agreeable pine-apple odor; it is insoluble in ether and chloroform, easily soluble in alcohol and water.

*Urostigma-papayotin* is obtained in a similar manner as the papayotin from Carica papaya, which it resembles in its solvent action on meat and coagulated albumen; the color is ash-gray.

*Doliarin* is obtained from the residue which remains on the filter (after filtering the diluted milk); the residue is dried, extracted with cold alcohol (sp. gr. 0.815), and the remainder extracted with boiling absolute alcohol. The last solution is filtered hot and cooled on ice, when snow-white flakes separate, which are odorless and possess a faintly acrid after-taste. It is soluble in petroleum-ether, ether, benzol, and boiling absolute alcohol, also in boiling potassa solution, separating on cooling. It is insoluble in alcohol, water, ammonia, acetic, hydrochloric and diluted sulphuric

acids; concentrated sulphuric acid dissolves it with a dark-red color, but on adding water red flakes are separated. The formula of the resin is $C_{23}H_{39}O_2$.

The bark of this tree yielded on analysis (per cent.): Wax 0.175, doliarin 0.787, caoutchouc 0.394, resin acid 0.335, alpha-resin 1.359, beta-resin 0.206, bitter extractive 0.350, extracts, salts, etc., 1.300, ash 8.100; papayotin could not be isolated. The two resins possess an agreeable odor of storax and olibanum, and dissolve in sulphuric acid with red color. A decoction of the bark is used in syphilis.—Pharm. Rundschau, N. Y., 1891, 166.

*Urticineæ of Brazil.*—In continuation of his former papers on the useful plants of Brazil (See Proceedings, xxxvi., 307; xxxvii., 429; xxxviii., 394) Dr. Theodor Peckolt describes the following Urticineæ: *Pharmacosycea radula*, Miq.; *Ph. vermifuga*, Miq.; *Urostigma eximium*, Miq., var. *glabrum; Ur. Dolarium*, Miq.; *Ur. Maximilianum*, Miq.; *Ur. cystopodum*, Miq.; *Ur. Kunthii*, Miq.; *Ur. atrox*, Miq.; *Ur. hirsutum*, Miq.; *Brosimum Gaudichaudii*, Trec.; *Br. discolor*, Schott.; *Sorocea uriamem*, Mart.; *Sor. ilicifolia*, Miq.; *Helicostylis Pœppigiana*, Trec.; *Soaresia nitida*, Fr. Allem.; *Sahagunia strepitans*, Liebmanni; *Sah. Peckoltii*, Schum.; *Artocarpus incisa*, Linn.; *Art. integrifolia*, Linn.; *Pourouma cecropiæfolia*, Mart.; *P. mollis*, Trec.; *P. tomentosa*, Mart.; *P. bicolor*, Mart.; *P. acuminata*, Mart.; *Cecropia surinamensis*, Miq.; *C. concolor*, Willd.; *C. carbonaria*, Mart.; *C. palmata*, Willd.; *C. adenopus*, Mart.; *C. hololeuca*, Miq.; *Maclura tinctoria*, Endl.; *M. xanthoxylon*, Endl.; *M. brasiliensis*, Endl.; *Dorstenia bahiensis*, Klotzsch.; *D. multiformis*, Miq.; *D. arifolia*, Lam. var. *pinnatifida*, Miq.; *D. brasiliensis*, Lam.; *D. bryonifolia*, Mart.; *D. opifera*, Mart.—Pharm. Rundschau, N. Y., 1891, 165, 219, 288.

### VALERIANACEÆ.

*Valerian oil*, according to an examination of J. E. Gerok, has approximately the following composition: Borneol valerianate, 9.54, borneol butyrate, 1.07, borneol acetate, 0.96, borneol formate 1.08, terpenes, 87.35.—Jour. der Pharm. v. Els.-Lothr., 1892, 85.—Am. Jour. Pharm., 1892, 233.

*Valerian Alkaloids.*—By Walizewski (L'Union). The author has discovered in valerian root two substances—chatinine and valerine—having an alkaline reaction, and forming crystalline salts with various acids.—Drug. Circ. and Chem. Gaz., 1891, 154.

### VITACEÆ.

*Grape Seed Oil and its Technical Application.*—By F. M. Horn, Mittheil. Techn. Gewerbe-Museums, 1891, 185–187. It closely resembles chemically and physically castor oil, and may be utilized for the manufac-

ture of Turkey-red oil. The seeds contain 20 per cent. of oil.—Jour. Soc. of Chem. Indus., 1892, 44.

ZYGOPHYLLEÆ.

*Guaiacum—Medicinal Value.*—W. Murrell calls attention to the valuable laxative properties of guaiacum resin. A proper dose would be 10 to 20 grains two or three times a day. Yearbook Pharm., 1891, 213, from Med. Press.

*Oil of Guaiacum.*—This oil is distilled from the wood of a South American guaiacum, the yield being 6 per cent. At ordinary temperature it is crystalline, possessing a violet-like odor reminding, besides, of tea; at a high temperature it becomes thick and viscid. The crystallizing body recrystallized from alcohol, fuses at 91° C.; the boiling point at 10 mm. is 148° C. The chloroformic solution is laevo-rotatory.—Pharm. Zeitg., 1892, 224.

*Guaiacol Biniodide, a New Aristol.*—Dr. Vicario (*Prog. Thérap.*, January, 1892) proposes guaiacol biniodide as a probable pulmonary antiseptic. It is prepared from guaiacol sodium by the action of iodine in potassium iodide solution. The guaiacol is treated with an excess of caustic soda, which produces a whitish mass gradually becoming greenish and violet. The guaiacol sodium is obtained in a pure and crystalline state by recrystallization from guaiacol. The guaiacol can be recovered by distillation. The crystalline compound is dissolved in water and to this is added a solution of iodine in potassium iodide as long as precipitation takes place. The precipitate is of a reddish brown color, possessing the odor of iodine, readily decomposable on heating, fusible on a water-bath and soluble in alcohol and fixed oils.—Am. Jour. Pharm., 1892, 195.

*Tribulus terrestris, L., and T. lanuginosus, L.*—By Prof. Sickenberger. A description and account of the properties of these two drugs.—Chem. Zeitung, 1891, 1240, 1524.

B. ANIMAL DRUGS.

*Fanciful Animal Remedies in Chinese Pharmacy.*—P. L. Simmonds has an interesting article on the above subject, which is too long to be inserted here. See Am. Jour. Phar., 1891, 413–416.

*Ambergris.*—A short resume of the history and varying prices of ambergris will be found in the Am. Drug., 1891, 341; from Chem. Drug.

*Ambergris.*—W. A. Dorman corrects some of the statements made, especially as concerns the reported finds of Americans.—Drug. Circ., 1892, 27.

*Castoreum.*—It is stated that there exists a beaver farm in Georgia (at Bascom). There are 200 of these animals, of which about 20 are killed annually. The young are born in April and May, and the females bear

two to six each year.—Phar. Jour. and Trans., Feb. 1892, 694; from Rev. Sci. Naturelles.

*Inferior Castoreum.*—W. Fossek describes in the Pharm. Post some castoreum entering commerce from Russia, which, by its appearance and putrid odor, excites attention; it does not appear to be an artificial product, but represents an abnormal, physiological natural product. An examination revealed 21 per cent. ash against 2 per cent. from good castoreum; this high percentage of ash is due to the presence of numerous globular concrements having a radiating structure and which are probably an organic calcium-combination. The alcoholic extract amounted to only one-half that obtained from normal castoreum.

L. Reuter, in the Schwz. Wochenschrift f. Chem. u. Pharm., 1892, 145, calls attention to the fact that commercial castoreum may give an aqueous extract, having either an alkaline or a neutral or slightly acid reaction; the alkaline extracts were never found to give indications of alkaloids, while the neutral or acid extracts very frequently gave precipitates with iodine solution and platinic chloride. Reuter believes that the alkaline reaction is due to some decomposition, and recommends that such castoreum be excluded from use in medicine.—Am. Jour. Pharm., 1892, 233.

*Cantharidin.*—Cantharidin in the form of cantharidinate of soda or of potassium, has been brought forward by Prof. Oscar Liebreich, of Berlin, as an effective remedy in tuberculous affections, principally lupus and laryngeal phthisis. Dr. Wolfert, of Berlin, has called attention to the interesting fact that as long ago as twenty years, Russian peasants habitually employed a species of beetle in cases of cancer. It was early noticed that this principle, cantharidin, exhibited the remarkable property of exciting exudation from the capillaries. This led Dr. Liebreich to select it as he now recommends. He uses the potassium salt hypodermically, and states that the sodium salt is much milder in action. His experience and that of several well known co-workers show that markedly beneficial results may be expected in diminishing the destruction of tissue common to tuberculous affections. Dr. Gerhardt, however, is reported as having used Liebreich's treatment in twenty cases with unfavorable results. It is to be particularly noted that the German observers seem to be convinced that slighter disturbance is produced with cantharidin than with the tuberculin of Koch.—Ephemeris (April 1892).

*Cantharidin—Vesicating Action of.*—By Dieterich. (Pharm. Zeitschrift für Russland, 1891, 333.) According to the author's observations, cantharidin purified by sublimation is far more painful in its action than that obtained by crystallization. This irritant action he ascribes to the empyreumatic products produced during sublimation.—Rép. de Pharm., 1891, 562, 563.

*Cantharidin—Derivatives.*—Anderlini has obtained and describes *can-*

*tharidinimide*, $C_{10}H_{12}O_3NH$, by the action of ammonia upon cantharidin; also substituted cantharidinimides by heating cantharidin with the proportionate quantities of amin bases in methyl- or ethyl-alcoholic solution to 140–160° C. He obtained further *cantharidic acid*, $C_{10}H_{12}O_4$, by the action of chlorosulphonic acid upon cantharidin; also *isocantharidin* and *isocantharidinic acid*.—Apoth. Zeitg. (Rep.), 1891, 91, from Ber., xxiv., 1993.

*The Action of Phenylhydrazin upon Cantharidin.*—By. L. Spiegel.—Berichte, 1892, 25, 1468–1470.

*Granilla, an Inferior Cochineal.*—By George A. Shaw (Pharm. Jour. and Trans., 1892, 1055, 1056). The author examined five samples of granilla, the results of which may be tabulated as follows:

| | | |
|---|---|---|
| A. Black variety contains: | | |
| Small cochineal insects and fragments | 86 | per cent. |
| Vegetable matter | 12 | " |
| Earthy matter | 2 | " |
| Ash | 20.5 | " |
| B. Gray variety contains: | | |
| Small cochineal insects and fragments | 36 | " |
| Vegetable matter | 26 | " |
| Earthy matter | 37 | " |
| Ash | 50 | " |
| C. Black variety, like A, contains of ash | 12.5 | " |
| D. Black variety (rounced) contains of ash | 25.5 | " |
| E. Gray variety, like B, contains of ash | 23 | " |

From these data it will be seen that granilla consists of the siftings of the cochineal insects, and contains such matters as might readily contaminate the cochineal during collection, and that it is not, as stated by some writers, a wild species of Coccus. At one time, as each bag of cochineal came into London, it was sifted, and the siftings, which were composed principally of dust, were known as "garblings," and constitute quite a different thing from granilla. This custom has, however, gone out of use, owing to the low price of cochineal.

In this paper the author describes the manner of obtaining the black-grey, silver-grey and rosy-black varieties in the Canary Islands.

It is interesting to note that in the examination of the first and second specimens, the author separated a collection of wing-cases of some foreign insects, together with two almost perfect specimens which were identified by Mr. Caban as two species of the Coccinelidæ, namely Hyperaspis connecteus and H. trimaculata. As neither of these species occurs in the Canary Islands, but are indigenous to Mexico, it follows that both samples of granilla are of Mexican origin, since each contained the wing-cases of these insects. The Coccinelidæ are parasitic on the Coccideæ and Aphidæ, the former being the family to which the Coccus Cacti belongs, and hence there is little wonder at their being found mixed with the cochineal insects.

*"Sugar-honey."*—Of late has appeared in Germany an artificial honey, under the trade name "sugar-honey," which consists of water, invert-sugar, a very small quantity of mineral substances and free acid, and to which has been imparted the flavor of good honey. Examinations did not reveal dextrin, cane-sugar, or any other foreign substances; and as made at present, it is chemically and physically not to be distinguished from the best honey.—Chem. Zeitg., 1891, 1053; Pharm. Centralhalle, 1891, 458.

*Eucalyptus Honey—A Challenge.*—Notwithstanding that this peculiar Australian honey has repeatedly been stamped a fraud, a firm in New South Wales some time ago again asserted that there really is a natural eucalyptus honey, which contains from 10 to 15 per cent. of essential oil when newly gathered. J. H. Maiden now offers to pay £5 to a fund if a sample of Australian natural honey can be produced containing only 5 per cent. of eucalyptus oil.—Chem. and Drug., July 11, 1891, 60; Am. Journ. Pharm., 1891, 516.

*Honey from Trebizonde—Poisonous Nature.*—Plugge has obtained direct proof that the poisonous nature of this honey (well-known from Xenophon) really is due to the bees frequenting rhododendrons, azaleas and other poisonous Ericaceæ, as has been long surmised. He injected frogs hypodermically with the honey (nectar) of the flowers of Rhododendron ponticum, and obtained all the symptoms of poisoning by andromedotoxin, which again corresponded with those observed in persons having partaken of the honey of Trebizonde. (See also Proceedings 1888, xxxvi., 411.)—Archiv d. Pharm., 1891, ccxxix., 554.

*Lac Insects in the United States.*—Several plants have recently been discovered in the United States which are infested by lac insects, notably the "stinkweed" and a certain kind of acacia. These flourish abundantly from southern Utah to northern Mexico, and from the Colorado Desert to western Texas. It is asserted that these valuable insects may be gathered with profit, and that the production of them could, with care and cultivation, be rendered so large as to make Americans independent of foreign supply.—Oil, Paint and Drug Reporter.

*Action of Leech Extract on Blood.*—Haycraft showed in 1886 that the extract of the anterior part of the medicinal leech possesses a strong anti-clotting action on blood. W. L. Dickinson proves from its general properties that the extract contains a proteid, having some features in common with Kuehne's proto-, and others with deutero-albumose. The albumose precipitated by ammonium sulphate has all the anti-clotting power of the original extract; the extract minus the albumose has no such powers. Hence, probably, the albumose is itself the active principle. Clotting in plasma obtained from blood, prevented from coagulation by admixture with leech extract (either intravenously or after it is shed), cannot be induced by carbonic anhydride or by dilute acetic acid; it can, however,

always be induced by a sufficient quantity of fibrin ferment. Such plasma gives no precipitate on cooling. Fibrin soaked in leech extract fails to yield ferment when subsequently treated with 8 per cent. sodium chloride solution; the extract, however, still contains cell-globulin. Cell-globulin prepared from lymphatic glands by Halliburton's method (1880) retains all its properties, except its fibrino-plastic power, when treated with leech extract. This is regarded an argument in favor of the non-identity of the cell-globulin and fibrin ferment.—Am. Jour. Phar., 1891, 412: from J. Chem. Soc., 1891, 482; J. Physiol., xi., 566–572.

*Cod-liver Oil—Estimation in Mixtures with Extract of Malt.*—See under *Extractum Malthi.*

*Cod-liver Oil—Improved Manufacture.*— Peter Moeller, the well-known manufacturer of cod-liver oil, has patented a process which prevents access of air during the trying-out of the oil. The trying-out is carried on in specially constructed boilers, through which a current of carbonic acid gas is constantly passing, which current is maintained until the contents of the boiler are cold.—Am. Drug., 1891, 315.

*Cod-liver Oil—Remarkable Adulteration.*—J. Bienert mentions that he found in Bostow (Russia) a cod-liver oil which on examination proved to be a yellowish vaselin oil with about 5 per cent. of cod-liver oil.—Pharm. Zeits. Russl., 1892, 104.

*Medicated Cod-liver Oils—Ferrated:* Sublimed, anhydrous ferric chloride, 3 parts, are titurated in a mortar until dissolved with 997 parts cod-liver oil. Forms a red brown clear liquid containing 0.1 per cent. metallic iron. *Iodized:* Iodine 1 part is triturated with chloroform 2 parts, and cod-liver oil 999 parts, added in portions. This preparation having odor, taste and color of cod-liver oil agitated with gelatinized starch should give no color. *Iodoferrated:* Reduced iron 2 parts, iodine 4 parts, and cod-liver oil 40 parts, are triturated in a mortar with the addition of a small quantity of ether until the iodine is chemically combined, and a black mixture results; this is then diluted with cod-liver oil to make 1,000 parts and filtered; contains 0.5 per cent. ferrous iodide, and is of a red-brown color. The trituration of the iron, iodine and a small quantity of cod-liver oil favors the formation of anhydrous ferrous iodide, which is readily soluble in the oil; in the older formulæ for this preparation the oil was warmed with the iodine and iron, which caused the iodine to unite chemically with the oil, leaving the iron in large part unchanged and undissolved.—*F. Weber, Schwz. Wochenschrift f. Chem. u. Pharm.*, 1892, No. 12.—Am. Jour. Pharm., 1892, 233–234.

*Adulterated Cod-liver Oil.*—J. Bienert reports a case of adulteration in which vaselin-oil (liquid paraffin) was present to the extent of 95 per cent.; the 5 per cent. cod-liver oil was of inferior quality.—*Pharm. Ztsch. f. Russl.*, 1892, 204.—Am. Jour. Pharm., 1892, 235.

*Artificial Musk.*—(A. Baur in Ber., 1891, 24, 2832–2843.) Artificial musk is, according to Baur, a trinitro derivation of butyltoluol of the composition $C_6H(CH_3)$ $(C_4H_9(NO_2)_3$. It is made by adding butyltoluol in the cold to five times its weight of a mixture of 1 part nitric acid sp. gr. 1.5, and 2 parts fuming sulphuric acid of 15 per cent. anhydride, and heating the mixture for eight or nine hours on a water-bath. Upon pouring this into water a crystalline mass separates, which, in order to maintain it pure, is again nitrated. When crystallized from alcohol, yellowish-white needles melting at 96° C. to 97° C. are obtained, which have an intensely musk-like odor. The salt is insoluble in water, easily soluble in alcohol, ether, benzol and chloroform. The homologues and isomers of butyltoluol yield nitro products which also have the odor of musk, but in a less marked degree.—Pharm. Record, 1892, 29.

*Synthetic Musk.*—By Ungerer.—American Druggist; Chemist and Druggist, 1891, 868; Jour. of Soc. of Chem. Indus., 1891, 655.

*The Musk Deer.*—By B. W. Petsche. An account of the habitat and habits of the musk deer, with an account of the hunting of this valuable animal.—Pharm. Era, Sept. 1891, 133.

*Musk.*—(By M. Gabriel Bonvalot, in a book upon his travels from Paris to Tonquin, through Russia, Thibet and China proper). He records several facts of pharmaceutical interest, among them he mentions Musk, as a Thibetan remedy.—Chem. and Drug.; Nat. Drug., April, 1892, 124, 125.

*Tonquinol.*—(See Am. Jour. Pharm., 1891, 289.) For its manufacture equivalent weights of oil of turpentine and isobutylalcohol are mixed and slowly added to 5 or 6 times its volume of concentrated sulphuric acid, preventing any rise in temperature; after one or two hours this mixture is poured into 5–10 times its volume of fuming nitric acid; when the nitrating is complete, the mixture is poured into a large excess of water, which causes precipitation of the nitro-derivative; it is collected on a filter and washed to neutral reaction. It forms a pale yellow powder of strong musk odor, melting at 70° C.—Pharm. Centralhalle, 1891, 459; Am. Jour. Pharm., Sept. 1891, 462.

## OLEA ANIMALIA.

*New Tests to Detect Vegetable Oils in Lard.*—If one gram or 25 drops of a fixed oil be dissolved in 5 c.c. chloroform in a test tube, 2 c.c. phospho-molybdic acid or sodium phosphomolybdate solution and a few drops of nitric acid added, there will be produced upon agitation an emerald green mixture; upon standing, two layers will separate, the lower chloroform solution being colorless, and the upper layer beautifully green. It is thought that the reaction is due to the vegetable oils containing minute quantities of alkaloids or glucosides, which reduce the phosphomolybdic acid. The color is obtained with all these oils if they have not been chemically treated to remove acidity or color; in such cases he

color may not be developed, or only after some time. If the acid solution be supersaturated with an alkali or alkaline carbonate, the green color changes to a blue, the intensity of which corresponds to the green color. Mineral and animal fats (paraffin, vaselin, lard, etc.) excepting cod-liver oil, will *not* give the green color. To test lard for such adulteration one gram is dissolved in chloroform and then proceeded with as mentioned. Another test for fixed oils which is serviceable in detecting cotton-seed oil in lard, is to add to the lard a cold saturated solution of picric acid in ether and allow the solvent to slowly evaporate; pure lard will then show a lemon-yellow color, whereas, admixed with cotton-seed oil, it will have a brown-red color; pure cotton-seed or other fixed oil will become brown. Phospho-tungstic acid will also suffer reduction through the fixed oils, especially cotton-seed oil and cod-liver oil; in this case there is produced a violet coloration which on addition of excess of alkali (ammonia) changes to a beautiful blue, but the colorations with this reagent are not as permanent as with phosphomolybdic acid.—P. Welmans, Pharm. Ztg., 1891, 798, and 1892, 22; Am. Jour. Pharm., 1892, 84.

*Wax—Examination.*—A. and P. Buisine propose the following method: The sample, dried at 110° C., should not lose more than 1 per cent. of its weight, and should leave no residue of mineral adulterants on being treated with hot chloroform or oil of turpentine. The melting point and density should correspond with those of beeswax. To estimate the soluble fatty acids, an excess of which would indicate the presence of vegetable waxes, and to detect soluble coloring matter, such as turmeric and annatto, 20 gm. of the wax is extracted with hot water. The dried residue is utilized for the determination of the free and total fatty acids, the unsaturated acids (by iodine absorption), the alcohols (by the amount of hydrogen liberated by alkalis), and the free hydrocarbons. The following table gives the results of the examination of the various adulterants known to be used:

| | Melting point. | Spec. Grav. | Soluble acids in mgm. of KHO. per gm. | Free acids in mgm. of KHO. per gm. | Total acids in mgm. of KHO. per gm. | Iodine absorption per 100 parts. | C.c. of hydrogen at 0° and 100 mm. yielded by 1 gm. | Hydrocarbons per 100 parts. |
|---|---|---|---|---|---|---|---|---|
| Japanese wax | 47°–54° C. | — | 2 | 18–28 | 216–222 | 6–7.55 | 69–71 | 0 |
| Chinese wax | 53.5° | — | 2 | 22 | 218 | 6.85 | 72.3 | 0 |
| Vegetable waxes | 47°–54° | — | 2 | 17–19 | 218–220 | 6.6–8.2 | 73–74 | 0 |
| Carnauba wax | 83°–84° | — | 0 | 4–6 | 79–82 | 7–9 | 73–76 | 1.6 |
| Mineral waxes | 60–80° | — | 0 | 0 | 0 | 0–0.6 | 0 | 100 |
| Paraffins | 38–74° | — | 0 | 0 | 0 | 1.7–3.1 | 0 | 100 |
| Suint wax | 62–66° | — | 0 | 95–115 | 102–119 | 13–18.5 | 0 | 14–18 |
| Fatty acids of suint wax | 50°–62° | — | 0 | 155–185 | 159–189 | 2.6–2.8 | 0 | 0 |
| Tallow | 42°–50.2° | — | 0 | 2.75–51 | 96–213 | 27–40 | 52–60 | 0 |
| Stearic acid | 55.5° | — | 0 | 204 | 209 | 4 | — | 0 |
| Rosin | — | — | 0 | 168 | 178 | 135.6 | 35 | 0 |
| Yellow beeswax | 62°–64° | 0.962 | 0–1 | 19–21 | 91–97 | 8–11 | 53–57.5 | 12.5–14.5 |
| White beeswax | 63°–64° | 0.967 | 0–2 | 20–23 | 93–110 | 2–7 | 53–57 | 11–13.5 |

—Jour. Chem. Soc., 1892, lxi. 251; from Bull. Soc. Chim., 654–660.

——— *Analysis.*—On account of the natural fluctuations of the acid, saponfiication and iodine numbers of yellow beeswax, adulteration with less than 6 per cent. of paraffin or ceresin is difficult to detect. C. Mangold recommends a method based on the observations of A. and P. Buisine, which essentially consists in saponifying with potassa, and heating with potassa-lime, by which treatment the higher alcohols are converted into fatty acids with elimination of hydrogen, which serves as a measure of their amount. The hydrocarbons are not attacked, and can be extracted from the residue. The author verified the statement of A. and P. Buisine, that beeswax naturally contains 12.5 to 14 per cent. of hydrocarbons, and therefore proposes to approximate the percentage of paraffin present by assuming the normal hydrocarbons of wax to be 13.5 per cent.

He has examined 21 different samples of European, African and Asiatic sources, of which the following are the average results: Hydrocarbons from 11.02 to 14.72 per cent.; acid number from 18.26 to 23.04 per cent.; true saponification number (after deduction of acid number) from 66.55 to 79.99 per cent. Bleached beeswax gives lower result for hydrocarbons than yellow wax.—Am. Jour. Pharm., 1891, 494; from Chem. Zeitg., 1891, 799.

——— A sample of yellow beeswax from Transylvania has an acid number of 16.66, and a total acid number of 72.68; that is to say, a true saponification number of 56.02, plainly indicating that it was adulterated with paraffin or some similar hydrocarbon. The total percentage of hydrocarbons was 28.12, corresponding to an addition of 17 per cent. of paraffin calculated on the original wax. The percentage of hydrocarbons and the total acid number of the mixture being known, the total acid number of the original wax could be calculated, and was found in this case to be 87.6. A mixture made by adding 8 per cent. of paraffin to a genuine sample of beeswax gave figures on analysis corresponding to an addition of 7.4 per cent.

*White Wax—Analysis.* - G. Buchner calls attention to the fact, often overlooked, that chemically bleached wax shows abnormally high acid and saponification numbers, as high sometimes as 24 and 100 respectively (20 and 95 being high for sun-bleached wax).—Journ. Chem. Soc., 1892, lxi., 665, from Chem. Zeitg., 1891, 1707.

——— *Test for Purity.*—H. Hager states that if a wax cylinder 3–4 cm. long and 5–6 mm. thick be placed in a test tube 8–10 cm. long and 1.2–1.4 cm. diameter, and covered with petroleum-benzin so that there is a layer of liquid 1–2 cm. above the wax, the following behavior is noticed with pure beeswax: From the surface of the cylinder small pulverulent particles are loosened and after 1½ to 2 hours the quantity of the wax taken will be found as a pulverulent deposit with an even surface; yellow wax may require three hours for this change, and the wax will be bleached, although the supernatant liquid remains colorless or is only faintly yellow. Adul-

terated yellow wax generally retains the color, also coloring the benzin yellow; adulterated wax cylinders will retain their form for a long time, *i. e.*, as long as 2 to 4 days, and then will not fall into powder, but will split into longitudinal sections, which may be straight or bent; if the adulteration amounts to only a few per cent., floccules may separate from the cylinder, and after 12–24 hours the sediment will consist of floccules, among which may be seen the longitudinal sections. The temperature for this test ranges from 14–18° C. (57–64.5° F.). All possible wax adulterants were examined by this test with very satisfactory results; it was also found that instead of the benzin, ether of specific gravity 0.720 could be used.—Am. Journ. Pharm., 1892, 23, from Drog.-Zeitg., 1891, 489.

*White or Insect Wax—(Report by United States Minister Denby, of Peking.)*.—A most interesting article is insect wax, of which 1,539,287 pounds were shipped from Ichang in one year. This immense quantity cost over 400,000 taels, $460,000 in gold. This insect wax, or white wax, is a product of the western part of the province of Se-Chuen and of parts of the adjoining province of Koei-Choo.

It seems that in Western China flourishes a tree called by the Chinese evergreen tree or crackling flea tree, from the popping of its branches when burned. In the end of May the tree bears clusters of small white flowers, which are succeeded by fruit of a dark purple color. Early in the spring there appear on the bark of the boughs and twigs of this tree numerous brown, pea-shaped scales. Upon opening these they are found to contain a mass of small animals, like flour, whose movements are almost imperceptible. These are the larvæ deposited by the white wax insect. These shells or scales are gathered by the Chinese about the end of April. The utmost care is taken to protect them from the heat, as the time of the development of the larvæ into insects is near at hand, and when this occurs they make their escape.

The white-wax scales are made up into small packages wrapped in leaves, about 20 or 30 scales in each package, and suspended under the branches of the tree. Holes are punched in the leaves which constitute their covering, and the insects, on emerging from the scales, creep up the branches to the leaves of the tree, among which they remain 13 days. They then descend to the branches and twigs, on which they take up their positions, the females doubtless to provide for a continuation of the race by developing scales in which to deposit their eggs, and the males to excrete the substance known as white wax. It is supposed that the wax is intended by nature to protect the scales.

The first appearance of wax on the under sides of boughs and twigs resembles snow, but it gradually spreads over the whole branch to the depth of ¼ inch. At the expiration of 100 days from the placing of the insects on the wax tree the deposit is complete. The branches are then cut off. As much wax as possible is removed by hand, but to secure what

remains the branches are afterwards boiled. This boiling of the branches destroys the scales and their larvæ, thus necessitating the bringing of fresh scales the following year from another locality. A pound of scales, it is said, will produce 4 or 5 pounds of wax.

The wax scraped off is put into boiling water, where it melts, and rising to the surface, is skimmed off and put into moulds. Here it solidifies and the work of manufacture is complete. The insects which have sunk to the bottom of the pot are pressed out, and when the wax has all been extracted from them, are fed to the pigs. A ton of this wax is worth at Shanghai about $1000. It is clear white wax, which melts only at a high temperature (160° F.), and is chiefly used to cover candles made of animal and vegetable tallow, to prevent too rapid combustion. It is used in some localities as a sizing for paper and cotton goods, a glaze for silk, and polish for furniture. It is also said to be used in Southern China as a polish for stone ornaments.—Pharm. Record, 1891, 380.

——— *Tests for Purity.*—In the laboratory of the *Bourse de Commerce* of Paris, the following method is used:

1. *Estimation of Stearic Acid (if present).*—Introduce into a flask 3 or 4 gm. of the sample for analysis, and bring it to the boiling point with 60 c.c. of alcohol of 96 per cent.; shake whilst cooling, and then titrate the alcoholic solution with half-normal soda, employing phenolphthalein as an indicator. Wax being only slightly soluble in cold alcohol, there is no need to take notice of its acidity, and the amount of the mixture can be calculated as stearic acid from the number of cubic centimeters of normal soda used in the titration, knowing that 7 to 8 c. c. half-normal soda equal 1 gm. of commercial stearic acid.

2. *Estimation of Paraffin or of Myristic Acid.*—To the flask containing the neutralized solution add 3 to 4 c.c. of solution of soda of 50 per cent., attach the flask to an upright condenser, and heat for an hour to saponify. The saponification being complete, distill off the excess of alcohol, put the residue into a capsule, mix with dry and short asbestos, dry at 100°, pulverize, and extract it with warm chloroform (or petroleum ether), which dissolves the whole of the paraffin and the myristic acid, representing a part of the wax. The paraffin is separated, as follows:

The chloroform holding in solution a part of the wax and all of the paraffin, is distilled off in a weighed flask, and the residue, having been dried at 100°, is weighed.

Then weigh in a small flask a part of the residue left by the evaporation of the chloroform, and treat it under an upright condenser for half an hour with 4 to 5 c.c. of anhydrous acetic acid. The acetylization being complete, pour the resulting fluid into a glass tube graduated in 10 c.c. and divided into tenths; rinse the glass with boiling crystallizable acetic acid, and turn the whole into the graduated tube. The volume of the liquid should be about 9 c.c. Place the tube in a water-bath at 90°, then close

it up with a cork and shake it forcibly so as to well emulsify the liquids, and replace in the water-bath.

When the acetic acid has become clear, the volume of insoluble matter which floats on the acid is read off. Renew the shaking and place in the water-bath until a constant volume of paraffin insoluble in acetic acid is obtained, of which calculate the weight, remembering that 1 gm. of paraffin equals from 1.35 to 1.4 c.c. On deducting the weight of the paraffin from the weight of the residue furnished by the chloroform, we obtain by difference the weight of the portion of the saponified wax soluble in chloroform.

3. *Estimation of Stearin.*—The saponified part insoluble in chloroform is formed by the soap of stearic acid and of stearin and by saponified cerotic acid. To estimate the stearin, dissolve in boiling water, filter to separate the sand and asbestos, and decompose the filtered liquor by a slight excess of nitric acid diluted so as to set free the fatty acids; filter and estimate the glycerin in the filtered liquid (after neutralization and precipitation by plumbic acetate), by the potassium bichromate process. From the weight of the glycerin calculate the stearin or suet, keeping in mind that 5 parts of anhydrous glycerin equal 95 of stearin.

In cases where the proportion of stearin is small, it would be preferable to saponify 10 or 25 gm. of the substance, and to estimate the glycerin by the bichromate process.

We therefore estimate by this method:

1. Stearic acid by alkalimetry.
2. Paraffin by measuring the part insoluble in acetic acid.
3. A part of the wax (myristic acid) by deducting the paraffin residue from the weight of the residue soluble in chloroform.
4. Stearin, by the estimation of glycerin.
5. The second part of the wax (cerotic acid) by difference—Am. Drug., July 1891, 221.

——— Dieterich has examined both white and yellow wax with the following results:

| | White. | Yellow. |
|---|---|---|
| Specific gravity at 15° C. | 0.963 to 0.968 | 0.963 to 0.966 |
| Acid number | 18.6 to 19.0 | 18.2 to 21.6 |
| Ester number | 71.8 to 74.0 | 71.4 to 75.6 |
| Saponification number | 90.8 to 92.6 | 90.0 to 97.2 |

—Apoth.-Zeitg. (Rep.), 1891, 81, from Helfenberg. Annalen.

*The Specific Gravity of Japan Wax.*—By O. Kleinstück (Chem. Zeit., 14, 1303–1304).—Abstract in Jour. Chem. Soc., 1892, 428, 429.

*Assay of Beeswax for Vegetable Wax.*—By H. Röttger (Chem. Zeit.,

14, 1442, 1443, 1473, 1474). The author criticizes the various methods from time to time proposed.—Abstract in Jour. Chem. Soc., 1892, 551, 552.

*Analysis of White Wax.*—By G. Buchner (Chem. Zeit., 14, 1707). The author a few years ago called attention to the fact that a genuine sample of white wax may show an abnormally high saponification or acidity number if it has been bleached by chemical means. The author's statements have been proven by Buisine to be correct. The acidity and saponification numbers may, in fact, come respectively as high as 24 and 100.—Jour. Chem. Soc., 1892, 665.

*Paraffinated Mogadore Wax.*—An adulteration of Mogadore wax with as high as 65 per cent. of paraffin.—Chem. and Drug., 1892, 698.

*Italian Yellow Waxes.*—Stefano Camilla has examined Italian yellow waxes with the following results: *Specific gravity* was determined with the picnometer of Unger (Beckurts' Jahresbericht, 1888, 145), and the results corrected to a temperature of +4° C. The range was from 0.959 to 0.966. Dieterich and Rudorff found the average sp. gr. to be 0.973; the German Pharmacopœia gives 0.962 to 0.966; the Russian Pharmacopœia gives 0.960; the Danish 0.960 to 0.970, and the Netherland 0.968 to 0.970. *Melting point* varies from 62.5° to 64.4° C. The point of solidification was from 0.5° to 1° C. less than the point of fusion. The German Pharmacopœia states it to be from 63° to 64° C.; the British 60° C.; the Austrian and that of Netherland 60° to 62° C.; the Danish 62°; the Russian 62° to 63°; the Swiss 62° to 64°, and the Hungarian 68° C. The *acid number.* One gm. of wax requires, according to Huebl, 19 to 21 mgm. of potassa; Hehner found 20 mgm.; Buisine 19 to 21 mgm.; Mangold 20 mgm.; the Italian waxes required 19.04 to 21.22 The *ether number.* One gm. of Italian wax requires from 72.18 to 76.05 mgm. of potassa, and the ratio of acid and ether numbers is therefore 3.55 to 3.8; Huebl determined it for German wax to be between 3.6 and 3.8; Mangold between 2.89 and 4.02, and Buisine between 3.5 and 3.8. The saponification number (total potassa required) varies for Italian wax between 91.22 and 97.27; Becker found 97 to 107 for German wax; Huebl 92 to 97; Buisine 91 to 97, and Mangold 88.26 to 99.9. *Volatile acids.* Reichert's method, modified by Meissl, is as follows: Saponify 5 gm. of the wax with 1 gm. of potassa dissolved in 50 c.c. of pure alcohol, distill off the alcohol after the reaction is complete, dissolve the residue in 100 c.c. of distilled water, add 20 c.c. of dilute sulphuric acid (1 : 10) and several pieces of pumice-stone to facilitate ebullition, collect 100 c.c. of distillate with decinormal soda. The number of c.c. necessary for neutralization is Meissl's number. This number for Italian wax varies from 0.35 to 0.40; for two samples from Liguria it was found to be 0.54 to 0.91. The *iodine number.* Italian wax, according to Huebl's method, varies with the intensity of color. In white wax it was from 2 to 7; in yellow wax from 8.18 to

11.06. In this connection, Camilla states that he questions the value of the iodine number; he does not agree with Buisine that the iodine absorbed is due entirely to the presence of oleic acid and other non-saturated acids of the series $C_nH_{2n-2}O_2$, but he claims that a part of the iodine must go to the unsaturated hydrocarbons, which amount to about 2.86 per cent., and must also be influenced by the coloring and odorous matters present.

Camilla has also examined the usual adulterants as follows:

| | Fusing Point. | Acid Numbers. | | | Iodine number. |
|---|---|---|---|---|---|
| | | Acids soluble in water. | Free acids. | Total acids. (Saponification.) | |
| Japan wax | 47–54 | 2 | 18–28 | 216–222 | 6–7.55 |
| China wax | 53.5 | 2 | 22 | 218 | 6.85 |
| Vegetable wax | 47–54 | 2 | 17–19 | 218–220 | 6.6–8.2 |
| Carnauba wax | 83–84 | 0 | 4–6 | 79–82 | 7–9 |
| Mineral wax | 60–80 | 0 | 0 | 0 | 0.06 |
| Paraffin | 38–74 | 0 | 0 | 0 | 1.7–3.1 |
| Grease wax | 62–66 | 0 | 95–115 | 102–119 | 13–18.5 |
| Suet | 42–50.5 | 0 | 2.75–5 | 196–213 | 27–40 |
| Stearic acid | 55.5 | 0 | 204 | 209 | 4 |
| Resin | — | 0 | 168 | 178 | 135.6 |
| Yellow beeswax | 62–64 | 0–1 | 19–21 | 91–97 | 8–11 |
| Bleached beeswax | 63–64 | 0–2 | 20–23 | 93–111 | 2–7 |

—Am Jour. Pharm., 1892, 196.

(For details of the method of ascertaining the acid, ether and saponification numbers, see Proceedings 1885, xxxiii., 200, and 1889, xxxvii., 653.)

*Wax Sheets.*—Beacock melts the wax in a deep vessel, and dips into it two pieces of glass, one in each hand, alternately, one cooling while the other is dipped (about three or four dips being sufficient), then drop the glass into cold water. By trimming the edges off the glass with a knife, the sheets will drop off themselves. If the wax is kept too hot, the sheets will be too thin; if too cold, they will be lumpy and thick. A tablespoonful of Venice turpentine to 3 or 4 pounds of wax will toughen it—Chem. Drug., April 1892, 635.

*Carnauba Wax.*—By Thomas Morong.—Pharm. Jour. Trans., Feb. 1892, 673.

*Wax in Leaves and Fruits.*—Etard has described a triatomic alcohol, *œnocarpol*, that is found in combination with palmitic acid in the pericarp of the white grape; a diatomic alcohol, *vitoglycol*, in the leaves of the vine; a monatomic alcohol, *medicagol*, in the leaves of the luzerne; and a hydrocarbon, *bryonane*, in the leaves of Bryonia dioica. These bodies are white, crystalline and fusible, their appearance as well as analysis, show a

relation to cholesterin. The extractive matters, sometimes vaguely described as wax of the leaves and fruits, are believed by Etard to belong to this class of bodies. Their connection with chlorophyll naturally suggests whether these different kinds of wax may not be connected with the development of chlorophyll.—Pharm. Jour. Trans., Feb. 1892, 690, from Comptes rendus, 1892, cxiv., 364.

*Cerotic Acid—Preparation.*—T. Marie prepares it by heating 125 gm. of beeswax with 3 litres of alcohol for two hours. After cooling, the alcoholic jelly is poured off and the treatment with alcohol repeated until the whole of the cerotic acid is removed. The alcoholic solutions are filtered and distilled with a little potassa, to retain the volatile acids; the distillate serves to dissolve the impure acid upon the filter. On heating this solution to boiling, the myricin present forms minute droplets which are deposited on cooling, and adhere to the flask. The supernatant jelly is poured on to a filter and washed with a small quantity of alcohol. After three such treatments and two crystallizations from alcohol, the acid is colorless, and melts at 76°–77° C.—Yearbook, 1891, 81, from Jour. Pharm. Chim., xxii., 343.

C. MINERAL DRUGS.

*Estimation of the Fats in Vaselin.*—Messrs. Vizern and Nicholas (Jour. de Pharm. et de Chim., 1891, ii, 49) for this purpose use the following reagents: (1) Titrated sulphuric acid, (2) A solution of potassium hydrate (from alcohol), 20 gm. in 100 c.c. alcohol of 90 per cent. which has been volumetrically tested (.1 c.c. = .0047 $K_2O$). (3) A solution of phenolphthalein 1 cg. in 500 c.c. alcohol of 90 per cent. to which is added sufficient potassium hydrate to produce a slight rose color. The method of using is as follows: To 10 grams vaselin in a porcelain capsule are added 10 c.c. of solution No. 2. The mixture is heated on a water-bath under constant stirring for eight minutes; then 50 c.c. of No. 3 are added and heated close to the point of boiling. The titrated sulphuric acid is then added, drop by drop, until the mixture becomes colorless. The number of c.c. of sulphuric acid used is subtracted from the number of c.c. necessary to neutralize 10 c.c. of the potassium hydrate solution and the difference multiplied by .0047, which gives the amount of $K_2O$ used. The further calculation is by using the equation $n : x :: 1.635 : 10$, where $n$ represents the quantity of potash absorbed. The result is then multiplied by 10, which gives the percentage of impurities present. The number 1.635 (grams) represents the amount of $K_2O$ necessary for decomposing 10 grams of the fats.—Am. Jour. Pharm., 1892, 27–28.

*Tumenol Preparations* are recent dermal remedies; they are prepared from the mineral oils obtained in the distillation of bituminous slate; after agitating the oils first with sodium hydrate and then with sulphuric acid, it is treated with fuming sulphuric acid; the dark syrupy liquid which

separates is washed with water and salt solution, and then dissolved in sodium hydrate solution; from this solution ether extracts what is called *tumenol-oil* (an aromatic, syrupy liquid, soluble in ether, ligroin and benzol); by the addition of hydrochloric acid to the sodium hydrate solution *tumenol-sulphuric acid* is precipitated (a black, bitter, odorless powder soluble in water, but precipitated by addition of acids). A mixture of these two substances forms *tumenol-venale*, a soft, resinous, odorless mass. They have strong reducing actions, and their effect is probably due to this; in this they differ notably from ichthyol, which owes its action to the sulphur present. Tumenol-preparations are used either as lotions or as ointments containing 5–10 per cent. tumenol along with zinc oxide or bismuth subnitrate.—(Deutsch. Med. Wochenschr.) Apoth. Ztg., 1891, 663.—Am. Jour. Pharm., 1892, 81.

# PHYSICS AND CHEMISTRY.

## GENERAL.

*Acidimetry—Fundamental Titre.*—Borntraeger recommends potassium bitartrate, which is easily obtained chemically pure, and is not at all hygroscopic, as fundamental titre for acidimetry and alkalimetry. Commercial potassium bitartrate is heated for several hours with water containing $\frac{1}{16}$ part of hydrochloric acid (1.13), allow it to cool while stirring, wash out the powder, recrystallize from pure water, and dry at 100° C. It may be considered pure when it requires exactly as much normal alkali as (after careful incineration) it requires of normal acid, and the amount of both solutions corresponds to that required by theory. For the titration of normal alkali it is weighed off as it is; for normal acid, a definite weight is carbonized at a gentle heat, the platinum crucible together with the contents extracted with water in a covered beaker, and the respective normal acid added gradually, until the reaction is faintly, but distinctly acid after boiling, and finally carefully titrated back with normal alkali, testing with sensitive litmus paper.—Zeits. analyt. Chem., 1892, xxxi., 43.

*Acidimetric and Alkalimetric Solutions—Standardizing.*—E. Hart and S. Croasdale take advantage of the well-known accuracy of the electrolytic method of estimating copper, and therefore pure copper sulphate is electrolyzed, and the copper carefully weighed. The exact amount of sulphuric acid in solution is then readily ascertained, and is employed for standardizing any desired alkaline solution, which, in its turn, serves for controlling the standard acids. By this means, the various disadvantages attached to the use of sodium carbonate, oxalic acid, or potassium oxalate are obviated.—Journ. Chem. Soc., 1891, 959, from J. anal. Chem., iv., part 4.

*Elderberry Juice as an Indicator.*—E. Gawalowski disagrees with Claude C. Hamilton in regard to the excellence of elderberry juice as an indicator, (see Proceedings 1891, xxxix., 407) stating that it is decidedly inferior to phenolphthalein, the transition from pink to green being too gradual, and requiring proportionately more alkali (respectively acid) than phenolphthalein.—Pharm. Post, 1891, 463.

*Sensitive Indicator.*—F. Mylius and F. Foerster have endeavored to obtain an indicator which would be sufficiently delicate to allow of the employment of millinormal solutions, and find that iodeosine answers the purpose admirably. The crude coloring matter must be purified by dissolving in aqueous ether, shaking the filtrate with soda solution, and precipitating the sodium salt by the addition of concentrated soda solution. The salt is recrystallized from alcohols dissolved in water, acidified with hydrochloric acid, and the precipitated iodeosine well washed with water. If used in the ordinary manner, this coloring matter is useless as an indicator, but if the titration is carried on in a stoppered bottle in presence of ether, and the whole shaken on addition of the reagent, the point of neutrality is distinctly shown, the slightest excess of acid causes the iodeosine to pass from the aqueous to the ethereal solution, leaving the former almost colorless. It allows the detection of quantities of alkali equivalent to 0.1 milligram $Na_2O$, and even of smaller amounts. Iodeosine ($C_{20}H_{8}I_4O_5$) is a brick-red powder, soluble without fluorescence but with a rose color in dilute alkalies, from which it is precipitated by excess of acid. —Jour. Chem. Soc., Sept. 1891, 1136, from Ber., xxiv., 1482–1498; Am. Drug., 1891, 358.

*Sulphur as Indicator.*—Werner Bolton draws attention to an indicator which indicates the change from alkalinity to acidity not by the production or alteration of a color, but by rendering the previously clear and transparent liquid turbid through the production of a most finely divided precipitate of sulphur. The indicator consists of a concentrated solution of sulphur in an alkali sulphide. The solution must be concentrated; since only a minute portion is to be used at one time. Supposing 250 c.c. of an alkaline liquid is to be titrated, it is sufficient to merely dip a glass rod into the indicator and then transfer it to the flask containing the liquid; it will be necessary to heat the liquid to the boiling point (to free it from ammonia and ammonium carbonate) before adding the volumetric acid. This indicator is especially suitable for factories, turbidity being more readily noticed than change of color.—Am. Drug., 1891, 286, from Zeitsch. angew. Chem., 1891, 492.

*Indicators—Thomson's Groups.*—Thomson has arranged neutrality indicators in three groups:

| Methyl-orange group. | Litmus group. | Phenolphthalein group. |
|---|---|---|
| Methyl-orange,<br>Cochineal,<br>Congo-red,<br>Lacmoid,<br>Iodeosine,<br>Dimethylamidoazobenzin. | Litmus,<br>Rosolic acid,<br>Phenacetolin. | Phenolphthalein,<br>Turmeric. |

—Chem. Drug., Jan. 1892, 104.

*Indicators.*—R. A. Cripps has lectured on the different indicators in use, from which lecture the following is abstracted:

Requirements of a good indicator:

(1) The end reaction should be marked by a prominent change of color. (2) To effect this change, the smallest possible quantity of reagent should be required. (3) High tinctorial power is desirable, so much less of the indicator will be required. (4) The change of color should be unaffected by the impurities commonly present in the substance under examination. (5) This change should be unaffected by the products of the reaction. No one indicator at present known will fulfil these last two conditions in all cases in which neutrality indicates the end reaction, therefore the analyst has to use his judgment in each case. It is a distinct advantage if the color reaction is equally decided in alcoholic as in aqueous liquids.

*Litmus—Uses.*—Litmus may be used in a very large number of titrations. It is of value in the titration of most mineral acids, and a few organic acids—*e. g.*, benzoic or oxalic. It also answers well in the titration of alkaline hydrates when free from carbonates; but for carbonates, bicarbonates or substances containing these salts, the liberated carbonic acid must be dissipated by boiling before a reliable end reaction can be obtained. It answers fairly well for ammonia, and under certain conditions for carbonate of ammonium and preparations containing it; also for borax. It is useless for phosphoric or arsenic acid, phosphates or arseniates, on account of the gradual change of tint. For many organic acids, *e. g.*, tartaric and citric, it is unsatisfactory, as the end reaction is very indistinct.

*Cochineal—Uses.*—Cochineal is a delicate indicator. It may be used with advantage in place of litmus for the titration of ammonia and its preparations. It possesses the great advantage of not being affected by carbonic acid, consequently carbonates and bicarbonates may be titrated without boiling. It has been used for the estimation of alkali in soap, but has been superseded by newer indicators.

*Phenolphthalein—Uses.*—Phenolphthalein is a most valuable indicator,

its well-marked and prompt change from colorless to pink, or *vice versa*, being so readily observed. It may be employed in the titration of mineral and organic acids and most alkalies; but it is quite useless in the presence of ammonia or its salts, unless special precautions be observed. It is neutral to bicarbonates, therefore to estimate carbonates the liquid must be boiled, as with litmus, or it must be largely diluted. For borax also it is inapplicable, the color gradually fading away as the acid is added. Phosphates and arsenites, containing one atom of replaceable hydrogen, are neutral to phenolphthalein, consequently phosphoric acid may be titrated by its use, but more satisfactorily by other indicators. Phenolphthalein does not produce the characteristic pink color with most alkaloids, but a few, *e. g.*, atropine, daturine and hyoscine, may be estimated by its use. One great advantage possessed by phenolphthalein over litmus is that its indications can be clearly read in many colored liquids, such as vinegar, lime-juice, aromatic sulphuric acid, etc.; and another is its employment in alcoholic solutions, with which the indications are almost as sharp as in water. On account of this latter fact, phenolphthalein is the indicator for the estimation of free alkali in soap and of free fatty acid in oil.

*Gallein*—(Synonyms: Anthracene violet, pyrogallolphthalein)—*Uses.*—Gallein is a more delicate indicator towards alkalies than phenolphthalein. Many of the alkaloids may be estimated by its use, among which may be mentioned strychnine, morphine, quinine, cinchonidine and atropine. It may be used in presence of ammonia or ammoniacal salts, and, like phenolphthalein, indicates sharply with citric, tartaric and other organic acids. Speaking generally, gallein may be used for most purposes for which phenolphthalein is employed, and also for ammoniacal compounds and many alkaloids.

*Methyl Orange*—(Synonyms: Poirrier's orange III., helianthin, mandarin orange, sodium or ammonium dimethylamidoazobenzenesulphonate, parasulphobenzene-azodimethylanilin.)

Properties of a good article.

1. Aqueous solution not precipitated by alkalies (orange 1 becomes red-brown; orange 2 brownish-red.)

2. Hot concentrated aqueous solution yields with HCl microscopic acicular crystals of the free sulphonic acid, soon changing to small lustrous plates or prisms, having a violet reflection (orange 1 gives a yellow-brown color, or flocculent precipitate; orange 2, a brown-yellow precipitate.)

3. Dissolves in concentrated $H_2SO_4$ with a reddish or yellowish-brown color, which on dilution becomes a fine red.

4. $BaCl_2$ yields a precipitate.

5. $CaCl_2$ yields no precipitate (orange 1 gives a red precipitate).

6. $MgSO_4$ in dilute solutions precipitates the coloring matter in microscopic crystals.

*Uses.*—Methyl orange is one of the most valuable of indicators. It is a salt of a comparatively powerful acid, consequently only those acids which are capable of displacing it in combination will give the indication, while, on the other hand, when the free acid is present in a liquid, the introduction of almost the weakest of bases is immediately shown. Methyl orange is, therefore, a very delicate indicator of alkalinity, but not of acidity, unless the acid be one of the powerful mineral acids. Its great value consists in the fact that carbonic, hydrosulphuric, boric, silicic, arsenious, oleic, stearic, and many other acids are totally without effect upon it, and, therefore, the bases in their alkaline or alkaline earthy salts can be determined with accuracy, just as though they were in the free state. It answers well for ammonia, but is altogether useless for the titration of citric, tartaric, oxalic, acetic, and almost all organic acids, the end reactions being only gradually produced; it acts well for sulphuric, nitric and hydrochloric acids, but is decomposed by nitrous acid. Phosphoric and arsenic acids are rendered neutral to methyl orange when only one-third of the acid has been combined with a base, the end reaction being well defined. We have previously seen that phenolphthalein indicates neutrality when two-thirds of the acid is combined.

Methyl orange cannot be used in alcoholic solution.

*Fischer's Reagent—Uses.*—(Synonym: Dimethylamidoazobenzene).—Speaking generally, Fischer's indicator may be employed in place of methyl-orange, which it advantageously replaces on account of the rather brighter tints; in alkaline solutions, yellow; in acid, pink.

*Lakmoid—Uses.*—(Synonym: Resorcin blue).—For strong acids or alkaline hydrates, lakmoid solution answers well, but for carbonates, sulphides, sulphites, phosphates, arseniates or borates, it is far preferable to use the papers, a minute drop of the liquid being removed by a glass rod and applied to the paper. In this way lakmoid may be used in place of methyl-orange or Fischer's reagent for the titration of borax, carbonates of sodium, ammonium, etc., effervescing preparations of magnesia, lithia and other carbonates, phosphates and many other salts. It is even preferable for phosphatic syrups, such as Easton's syrupus ferri phosphas. It is, in fact, more easily allied to methyl-orange than to any of the other indicators, and the factors are the same; like it, lakmoid cannot be employed for citric, oxalic, lactic, acetic, tartaric and some other organic acids.

*Iodeosine—Uses.*—(Synonyms: Erythrosine, Tetraiodfluoresceine).—The solution to be tested is contained in a stoppered flask, and four drops of an ethereal solution (2 mgm. per litre) added, or an aqueous solution (1 : 10,000) added, and sufficient ether to give a distinct layer after agitation. If the liquid be acid, the ether will be colored a yellowish tint, which becomes colorless when rendered alkaline and shaken, the aqueous layer becoming a pale rose tint. This indicator is of value in such cases as require great delicacy, and for estimating alkaloids it is the best indicator according to Cripps.—Chem. Drug., 1891; Drug. Circ., 1892, 29–32.

*Alchemy.*—A series of very interesting articles on this subject has appeared in Chem. Zeitg., 1892, 15, 46, 78, 252, 316, 534, 615, 672, 695.

*Atomic Weights.*—Clarke's table (See Proceedings 1891, xxxix., 471) has been severely criticized by Lothar Meyer and Carl Seubert, partly because the values adopted for the construction of the table frequently differ widely among themselves, and partly because of the adoption of O=16 (should be 15.96) as the basis of the system, the authors considering H=1 as more rational and also more convenient. The chief difference between Clarke on the one hand and Meyer and Seubert on the other, is merely this: Clarke advocates the use of atomic weights which are sufficiently correct for all practical purposes, and maintains that, as long as the ratios are correct, the absolute correctness of their point of reference is unessential, while Meyer and Seubert prefer a theoretically correct table, subject to the inevitable fluctuations which future investigations must necessarily bring.—Pharm. Rundschau, 1891, 79, 108.

*Boiling Point—Determination with Small Amounts of Material.*—A. Schleiermacher determines the boiling point in such cases by measuring the temperature at which the pressure of the saturated vapor of the substance in question is equal to that of the atmosphere. He illustrates and describes an apparatus which he has devised.—Journ. Chem. Soc., Aug. 1891, 873, from Ber., xxiv., 944–949. (It is pointed out by the editor of the Journal that his apparatus is practically identical with one devised by H. Chapman Jones, 1878, J. Ch. S., p. 175). See also Am. Drug., July 1891, 201.

*Constitution of Chemical Compounds—Modern Ideas.*—A résumé by C. E. Boucher in Pharm. Jour. and Trans., July 11, 1891, 24.

*Chemistry.*—Mendelejeff, setting out from Newton's third law of motion ("To every action there is always opposed an equal reaction; or, the mutual actions of two bodies upon each other are always equal, and in opposite directions") shows that it is possible to preserve to chemistry all the advantages arising from structural teaching without being obliged to build up molecules in solid and motionless figures, or to ascribe to atoms definite limited valencies, directions of cohesion, or affinities. The third Newtonian law is, in fact, the great principle of substitution which since the middle of the century has led to such triumphs in chemistry, and from which still higher results are expected.—Chem. News, 1892, lxv., 35.

*Chemical Mechanics.*—The following passage is found in Mendelejeff's "Principles of Chemistry": The theorist who will explain and simplify the mass of phenomena which has been observed, has yet to come. Newton was possible only after Copernicus and Kepler, who had discovered the exterior empirical simplicity of celestial phenomena. Lavoisier and Dalton may in respect to the chemical mechanics of the molecular world be compared to Copernicus and Kepler. But a Newton has not yet ap-

peared in the molecular world; when he does, I think he will find the fundamental laws of the mechanics of the invisible movements of matter more easily and more quickly in chemical structure of matter than in physical phenomena (of electricity, heat and light); for these latter are accomplished by already-disposed particles of matter, whilst it is now clear that the problem of chemical mechanics mainly lies in the apprehension of those movements which are invisibly accomplished by the smallest atoms of matter.—Chem. Drug., Nov. 1891, 815.

*Chemical Theory—Progress.*—Persifor Fraser has delivered an address before the Franklin Institute, tracing the history of chemical theories from the earliest date up to the present time. We regret that we have not sufficient space for this review, highly interesting as it is; we will, therefore, only give the remarkable view of Democritus (who lived 450 B. C.), which is so astounding in its character, and so accurate in most of its statements, that only in the past few years have chemists been able to reach these profound thoughts.

The universe consists of *atoms* and *space.* The atoms are of many forms and of different weights, and the number of atoms of each form infinite. Change is only the combination and separation of atoms! Atoms are in constant motion. "First beginnings" or atoms are never destroyed or worn out. The difference between a hard body like iron and a soft body like air is that in the first the atoms move to and fro within small distances; in the soft body they move freely or rebound from each other only at long intervals.

Bodies are partly "first beginnings," partly unions of "first beginnings." The properties of the bodies formed of the groupings of "first beginnings" need not be like properties of the "first beginnings" themselves. "It matters much with what others and in what positions the first beginnings of things are held in union, and what motions they do mutually impart and receive."

These views are extraordinary, and with the exception of the difference in the form of atoms, which is a point beyond what we have been able to reach even now, the above contains a very fair statement of the atomic theory which is held by the most advanced chemists to-day.

How Democritus could have reached such conclusions is a mystery.—Am. Drug., Aug. 1891, 229.

*Chemism in Living Protoplasm.*—W. Preyer and G. Wendt have a highly interesting article on this somewhat abstruse subject, the drift of which may be gathered from the following conclusions: It is a highly probable hypothesis if we assume as the necessary foundation for all protoplasmic chemical activity, and consequently for all vital processes, the constant presence of capillary spaces in every protoplasm, as in them the action of masses can not be reached, and the single actions must accumulate. In

capillary spaces there can take place, from a certain size onward, merely an ordinary chemical process, since below a certain size, capable of being experimentally determined, no action of mass is possible. In such truly capillary spaces there occur, in place of the coarse reaction of masses, the most subtile individual reactions. This individual reaction is totally distinct from the chemical mass reaction in the test-tube, in the retort, in the flask. In every living being the manner in which the chemical processes take place in it, that is to say in its protoplasm, is unlike.—Chem. News, 1891, lxiv., 275, 287, 314; 1892, lxv., 4, 20, 28, 40.

*Chemicals—Methods of Ascertaining the Limits of Impurities.*—C. O. Curtman read a paper before the Missouri Pharm. Association on the above subject, in the course of which he says that the methods adopted to ascertain whether the quantity does or does not come within the prescribed limit should be such that any skilled pharmacist could execute them without great loss of time, and without having at his command the special apparatus and the special experimental training of the professional analyst. Hence the more elaborate quantitative methods should, where possible, be replaced in the Pharmacopœia by those which are at once of sufficient approximation to accuracy, and yet capable of easy and rapid execution. For this purpose two methods appear to be especially adapted. First, the employment of reagents possessing different degrees of sensitiveness for the same substances. Secondly, the addition of a definite proportion of a standardized solution of a reagent, to remove by precipitation a corresponding amount of the suspected impurity up to the limit allowed, and the subsequent testing of the filtrate by an additional amount of the same reagent, when the occurrence of any visible change would indicate the presence of more than the permitted limit of impurity. Each of these methods may prove useful in pharmacopœial testing, and secure results with sufficient accuracy and promptness to answer every pnrpose.

With respect to the expressions often met with: "a faint opalescence," "slight turbidity," "scant precipitate," etc., he says that instead of this vagueness of estimation it would be far better to settle on a definite percentage of impurity to be allowed, and then ascertain that the amount is not exceeded by adding the exact quantity of a reagent required to remove such percentage of impurity by precipitation. After filtration, no more visible change should then be produced by an additional amount of the reagent.—Am. Drug., Aug. 1891, 233.

——— Biltz adds his testimony to that of so many others, that a pharmacopœia should direct definite quantities of the different substances used in testing, and not employ such vague expressions as: small or large excess; a little; a few drops; etc.—Phar.-Zeitg., 1892, 18.

*Chemistry.*—W. Preyer advances a system of chemistry which is based on the supposition that all elements are merely more or less condensed

hydrogen (or, rather, "cosmic ether," unless the latter be only a very much diluted hydrogen). This system is named "the genetic system of the elements." Interesting as it is, it is impossible here to do more than refer the reader to the original.—Phar. Centralh., 1892, 202; from Naturwiss. Wochenschr.

*Micro-organisms in their Relation to Chemical Changes.*—An article on this subject by Percy F. Frankland, which admits of no useful abstraction, will be found in Pharm. Jour. Trans., May 1892, 953–958.

*Color—Influence of Temperature.*—A highly interesting paper on this subject by Nichols and Snow has appeared in the Philosophical Magazine, 1891, 401, which can not well be condensed. Of the results arrived at only two will be mentioned: (1) The light reflected from the surface of any pigment is nearly white. It is to the light reflected from the interior faces that the pigment owes its color. (2) The effect of heating the pigment is invariably to diminish its reflecting power, the diminution being, as a rule, more marked in regions of the greatest refrangibility, and the changes observed are due to this unequal loss of reflecting power; the "shifting of the color towards the red," arises from the fact that the loss of brightness is least in the red, and increases rapidly towards the violet end of the spectrum.—Pharm. Jour. Trans., Nov. 1891, 428.

*Crystallization and Crystallizing Media.*—Lassar-Cohn gives some practical hints regarding the best methods of using solvents as crystallizing media, some of which may be of interest to pharmacists. *Water.*—If water is used for recrystallizing substances affected by the air, a little carbon disulphide or sulphurous acid should be added to the water. *Ether.*—When ethereal solutions are to be evaporated so as to obtain the dissolved substance in crystals, it is advisable to treat the solution first with chloride of calcium, in order to remove the moisture or water which will adhere to the crystals after the ether has evaporated. *Glacial and ordinary acetic acids.*—When these have been used as solvents, the crystals are freed from the adhering liquid either by allowing the latter to evaporate over caustic potassa in a desiccator (without rarefying the air), or by drying them in a current of air at 100° C. or over soda-lime in vacuo. "*Salting out.*"—In many cases a substance may be caused to separate from an aqueous solution by dissolving in the latter certain substances which throw the others out of solution. Such substances are chloride or sulphate of sodium, potassium, potassium carbonate, etc.—Am. Drug., Aug. 1891, 237, from Arbeitsmeth. organ.-chem. Lab.

*Crystals—Artificial Coloring.*—O. Lehmann has investigated the conditions under which the coloration of crystals by certain organic dyes takes place, and he summarizes his results as follows:

The coloring of the crystals is in nearly all cases dichroic, a proof that the coloring matter actually enters in some way into the structure of the

crystal. The remarkable rule is observed that only one of the two rays produced by double refraction is colored, whilst the other appears to be perfectly white, the colorless ray being always the one which has undergone the least refraction.

If two coloring matters are present in the solution, the presence of the one often hinders the absorption of the other. In some cases, however, the reverse takes place, and a coloring matter which alone would not be absorbed may become so when some second coloring matter is added. Change of the solvent, or the addition of other solid or liquid foreign matter, may act in a similar manner.

Different crystals are only capable of taking up certain organic dyes, so that two compounds of perfectly similar appearance may be capable of combining the one only with one, and the second only with some other dye. This fact may obviously be made available in distinguishing crystals one from another. It may also, perhaps, be applicable for the purification of certain dye-stuffs.—Am. Journ. Pharm., 1892, 321, from Zeits. phys. Chem., viii., 543–553.

*Dialysis by Means of Calcium Sulphate.*—A. L. Herrera published some time ago a new method of dialysis based on the well-known fact that when water or an aqueous solution is separated from a porous substance by a membrane of parchment paper, the water passes through it, carrying with it the dissolved crystalloids, but not the colloids. Freshly calcined calcium sulphate, being a chemically indifferent substance, is best suited for this purpose, the crystalloids being easily removed from it by a suitable menstruum, especially by alcohol. As a general rule, he recommends to macerate the powdered drug for 24 hours with water acidulated (slightly) with tartaric acid, then to filter, and subject the filtrate to dialysis in a parchment paper filter embedded in the calcined calcium sulphate, taking care that the contact with the outer surface of the filter be as perfect as possible. After the dialysis is finished, the calcium sulphate is exhausted with alcohol, which is then evaporated.

Guadalupe Morales finds, as the result of repeated trials, that this process is not suited for the quantitative extraction of alkaloids, but admits that it may be of value qualitatively, especially in forensic investigations. From opium, which according to Squibb's method contained 14.41 per cent. of morphine, Morales did not succeed in getting more than 7.77 per cent.—Am. Jour. Pharm., 1891, 425–428.

*Dispersion—Relation to Chemical Constitution.*—By J. W. Bruehl.—Jour. Chem. Soc., July 1891; from Zts. phys. Chem., vii., 140–193.

*Molecular Refraction and Dispersion of Various Substances in Solution.*—By J. H. Gladstone. Is not suitable for abstraction.—Jour. Chem. Soc., Aug. 1891, 589–598.

See also under *Refraction.*

*Electro-Chemistry—Essentials.*—T. A. Ellwood has written a very instructive paper on the essentials of electro-chemistry, for which see Drug. Circ., 1891, 148–150, from Chem. Drug., June 1891.

*Evaporation—Electrical.*—William Crookes has an interesting article on this subject in Pharm. Jour. and Trans., July 11, 1891, 24, which cannot profitably be abstracted, and is too long for insertion in this Report.

*Exsiccator—Improved.*—Walter Hempel reverses the usual arrangement by placing the substance to be dried below the moisture-absorbing medium, claiming that a much more rapid and perfect effect is produced. He suggests the following form of apparatus, which is illustrated in the journals mentioned below.

The apparatus consists of a cylindrical glass, and of a cover, which has the form of the well-known glass fly-traps. The sulphuric acid is contained in the annular groove of the latter. The neck of this vessel is closed with a hollow stopper (provided with a stopcock) which may be connected with the air-pump. The form of the upper vessel permits the latter to be laid upon its side when it is temporarily taken off the cylinder. This prevents the ground bottom from becoming gritty with dirt, etc., which would interfere with its air-tight fitting.

In making or choosing the upper vessel, the opening in the bottom should be as large as possible, and its upper flange should be slightly curved toward the outer wall.—Chem. Centralbl., 1891, 1, 908; Am. Drug., July 1891, 217.

*Exsiccators.*—Biltz tested the correctness of Hempel's assertion that in exsiccators the dryer should be put above the substance to be dried, and not beneath it, as usual. He made the experiment with water and sulphuric acid, using two absolutely similar glass jars; in one the acid was placed above, and in the other below the water. After 36 hours the water had disappeared in the jar in which the acid was below the water, whilst it took 44 hours before an exactly similar quantity of water disappeared, when the acid was placed above the water; Biltz concludes therefore that Hempel is incorrect, and from practical considerations thinks that the relative position of drier and substance to be dried is immaterial.—Chem. Zeitg., Rep., July 1891, 182, from Pharm. Centralh., 1891, 353.

W. Hempel maintains the correctness of his assertion that the acid ought to be placed above the substance to be dried, and adduces new experiments in support. He admits, however, that where the quantity of water to be absorbed is comparatively small, and where the size of the exsiccator (in proportion to the size of the capsule) is rather large, it makes little difference whether the acid is above or below the substance.—Pharm. Centralhalle, 1891, 453.

*Electric Light—Application.*—Dr. Estanislao v. Stein uses this light as a therapeutic agent in the treatment of neurasthenic, hysterical and rheu-

matic affections. He claims to have obtained surprising results by illuminating a painful joint or nerve, as in cases of sciatica, for two to five minutes.—Chem. and Drug., July 11, 1891, 54.

*Refrigeration—Pictet's Researches.*—Pictet has erected in Berlin a small factory provided with machinery intended to withdraw heat from objects, and to keep them at any temperature between —20° and —200° C., as long as may be required. (For an account of the purification of certain chemicals by very low temperatures see "Chloroform" in Proceedings 1891, xxxix., 560.) He has arrived at the questionable opinion that the slow oscillations of matter, which constitute the lowest degrees of heat, pass more readily through the obstruction of a so-called non-conductor than those corresponding to a higher temperature. From this he infers that it is practically impossible to prevent the access of a certain amount of caloric to the refrigerating cylinder from the outside. Absolute zero is —273° C., but Pictet doubts whether more than about —255° C. is attainable.—Phar. Jour. and Trans., Nov. 1891, 428; from Nature, Nov. 1891, 31.

*Pictet's Fluid.*—Carbonic anhydride in the solid state is much used for producing an intense cold, but as it is not easy to bring it into very close contact with a solid body, it is generally necessary to mix it with some liquid, for instance ether. Raoul Pictet has lately obtained better results from a mixture of carbonic anhydride and sulphurous acid, which has received the name of "Pictet's fluid." Aided by a pressure of from nine to twelve atmospheres, gaseous nitrous oxide is readily liquefied.—Drug. Circ., 1891, 227.

*Low Temperatures—Production.*—An instructive paper on this subject will be found in Am. Drug., 1891, 261–262.

*Luminosity of Coal-gas Flames.*—Vivian B. Lewes has investigated this subject and arrives at the following conclusions: In the inner non-luminous zone, the hydrocarbons heated up by the combustion of the hydrogen and some of the methane undergo certain changes, which result in their conversion into acetylene, and this, readily decomposible by heat or detonation into carbon and hydrogen, breaks up when a sufficient temperature is attained; owing, however, to the diluting action of the nitrogen and other flame gases, this does not take place until the top of the non-luminous zone is reached, where at a temperature of a little over 100° C., the decomposition occurs with an increase of temperature, and the liberated carbon, being heated to incandescence, gives the luminosity to the flame. The extreme outer zone is rendered non-luminous by the cooling and diluting influence of the entering air.—Jour. Chem. Soc., 1892, Trans., lxii., 322–339.

*Indicators*, see *Acidimetry*.

*Gases—Rate of Explosion.*—Harold B. Dixon has repeated and ex-

tended the experiments of Berthelot which confirm the truth of Berthelot's statement that the explosion-wave is a "specific constant" for every gaseous mixture, and that the determination of the rate may throw some light on the mode in which chemical changes are brought about. For the details of this interesting paper the readers are referred to Chem. News, 1891, lxiv., 70.

*Molecular Weights of Liquids and their Boiling Points.*—H. M. Vernon endeavors to show that it is possible to obtain some indication as to the probable value of the molecular weights of liquids from their boiling point. He further argues from a study of their boiling points that in all probability all compounds, both organic and inorganic, containing one or more hydroxyl groups, have in the liquid state molecular weights double those expressed by their ordinarily received formulæ. For particulars of this subject reference must be had to the original paper.—Chem. News, 1891, lxiv., 54–58.

*Minerals—Determination of Melting Points.*—J. Joly has a paper on this subject, which cannot well be condensed. Reference must be had to Chem. News, 1892, lxv., 16, 30, 41.

*Liquids—Analysis by Capillarity.*—E. Gossart has observed that every liquid may be caused to roll in drops upon itself, the drops being separated from the main body of the liquid by a thin stratum of vapor. There is this peculiarity, that a drop will only roll upon the supporting liquid, in case both contain the same percentage of the same impurity, or that this percentage only varies within fixed limits. It will be possible to find the amount of impurity within $\frac{1}{500}$ of the total. Each impurity behaves as if it alone were present. Using two pure liquids, the drops of one never roll upon the other, owing to the immediate absorption of the separating film. —Jour. Chem. Soc., 1392, lxi. (Abstr.), 236; from Comptes rendus, cxiii., 537–540.

*Molecular Weight and Raoult's Law.*—Raoult's law, which Victor Meyer considers the most significant contribution to the list of physical processes applicable to chemical investigations since the discovery of the law of Dulong and Petit in 1819 (Ber. Chem. Ges., 1888, xxi., 536), may briefly be stated as follows:

If the depression of the freezing point caused by dissolving substances in 100 gm. of water be divided by the weight of the substance used (expressed in grammes) a coefficient of depression is obtained, which, when multiplied by the molecular weight of the substance, gives approximately the same quantity. This constant is termed the molecular depression, and in case of water is about 19 (and it is also constant for each kind of any other solvent; for benzin it is 25, for acetic acid it is 39, etc.)

It will be evident that molecular weight and depression of freezing point stand in inverse ratio to each other. The higher the molecular weight of

a substance, the lower the depression of freezing point caused by it; the lower the molecular weight, the greater the depression. It will also be evident that these facts may be made use of for the determination of molecular weights, since 19 (water as solvent) divided by the coefficient of depression, gives the molecular weight of the substance under examination. This method also furnishes additional proof of the correctness of the whole molecular theory, and of the correctness of the molecular weights of substances as determined by chemical means only in many cases heretofore. For further particulars of this interesting subject, reference must be had to the article of W. Simon.—Drug. Circ., 1892, 90; from Phar. Review, 1892, 2–4.

*Precipitation.*—G. Watson states as there sult of experiments with antimonium chloride, sodium antimonate, calcium hydrogen orthophosphate, and calcium carbonate, that the transition of certain precipitates from the amorphous to the crystalline form is due to the lower solubility of the crystalline form as compared with the amorphous form. The amorphous form is first precipitated, then dissolved in the circumambient solution until the latter is supersaturated, crystallization then sets in, liberating the mother liquor, ready to dissolve more of the amorphous precipitate, and so on.—Jour. Chem. Soc., Aug. 1891, 875, from Chem. News, lxiii., 109.

*Precipitates—Properties.*—E. Waller has given in a table the properties of the various forms in which substances are separated in quantitative analysis for the purpose of weighing and determination. This table is accompanied by a statement of the properties of the precipitates, etc., which are used for the purpose of separation, grouped under the heads of: General remarks, conditions of separation, solubilities, contaminants, ignition. —Chem. News, 1891, lxiv., 208, 218, 229, 247, 257, 268, 278.

*Refractive Power of Certain Organic Compounds at Different Temperatures.*—W. H. Perkins.—Chem. News, July 10, 1891, 19.

*Organic Compounds—Refractive Power at Different Temperatures.*—W. H. Perkins has investigated the influence of temperature upon the refractive power of certain organic compounds: Water, heptane, octyl iodide, methylene iodide, toluene, phenyl chloride, iodide and bromide, aniline, dimethylaniline, naphthylamine, ethyl cinnamate, thymol. Not being suitable for abstraction, reference must be had to the original paper.—Jour. Chem. Soc., lxii., 1892; Trans., 287–310.

See also *Refractometer* under "Laboratory apparatus," and *Oleorefractometer* under "Essential Oils."

*Automatic Sprengel Pump.*—H. L. Wells illustrates and describes a Sprengel pump in which the mercury is raised automatically by means of water pressure.—Jour. Chem. Soc., Aug. 1891, 875, from Ber., xxiv., 1037.

*The Liquoscope.*—K. Sonden has devised an apparatus for comparing the refractive indices of liquids, which consists of two similar hollow

prisms, which are immersed, side by side, in a glycerin bath formed of a cylindrical vessel with glass ends. When both prisms are filled with liquids having the same refractive index, a horizontal black line observed through them appears continuous; but if the indices are different, one part of the line is displaced with respect to the other. This instrument might be serviceable for indicating adulteration of butter, oils, etc.—Jour. Chem. Soc., 1891, 959, from Zeits. anal. Chem. xxx., 196–199.

*Solutions—Determining the Concentration.*—H. O. G. Ellinger proposes to use the oleorefractometer of Amagat and Jean for determining the concentration of solutions by their refractions.—Jour. f. prakt. Chem., 1891, xliii.

For description and use of the instrument see Urine, optical detection of albumen.

*Salts, Formation—Nature of Chemical Change in the Case of Non-Electrolytes.*—Henry E. Armstrong.—Chem. News, July 10, 1891, 20.

*Solubility of Salts.*—G. Bodlænder has investigated in which way the solubility of a salt in water is influenced by the addition of alcohol or a second salt. He found that the solubility is diminished in such a way that the quotient of the quantity of water present in the solution by the cube root of the quantity of original salt is approximately constant.—Journ. Chem. Soc., 1891, 794–796, from Zts. phys. Chem., vii., 308, 358.

*Solutions—Theories.*—H. G. Garnett has given a resume of the theories concerning solutions of gases in gases; gases in liquids; liquids in liquids; solids in liquids; vapor pressures of solutions; freezing points of solutions; volume occupied by salts when they enter in solution. None of these paragraphs can be intelligibly condensed; reference must be had to Pharm. Jour. Trans., Dec. 1891, 484–486, or Drug. Circ., 1892, 28–29.

*Solution—Theory.*—The new theory, in brief, holds that the particles of a body in solution obey laws having exactly the same form as the laws of gases. In dilute solutions the conditions are similar to those in a perfect gas; concentrated solutions show deviations similar to those shown by gases near the point of liquefaction. For data see Am. Jour. Pharm., July 1891, 352, from Ph. Jour. Trans., May 16, 1891, 1018, Drug. Circ., 1891, 161. For discussions on Pickering's "hydrate theory of solution" see Chem. News, vols. 62 and 63, and also Jour. Chem. Soc., July 1891, 786–791; likewise Chem. News, vol. 64, 1. Deductions from the "gaseous theory of solution" by O. Masson (that solution and vaporization are perfectly analogous processes); controverted by S. U. Pickering, see Jour. Chem. Soc., July 1891, 791–793. For other views of the nature of solution see papers by J. A. Wanklyn, W. J. Cooper and W. Johnstone, in Chem. News, 1891, 27, 39, 51, 146.

——— From his researches conducted during the past two years, J. Alfred Wanklyn deduces the following general law: The volume of a

mixture is equal to the sum of the volumes of its constituents separately measured. So long as there is no actual chemical action between the molecules of a gaseous mixture, the fact that the molecules are dissimilar has no influence upon the volume. With liquids the same law holds.

As to solutions, the law holds with solutions of sugar in water: Up to and no doubt considerably beyond a strength of 105 gm. sugar in the litre, these solutions have exactly the same volume as the water and sugar measured separately.

With saline solutions the case is different, showing quite marked contraction. Wanklyn views saline solutions as mixtures of fluid hydrates with water, the fluid hydrate simply diffusing in the water, without change of volume of any kind.—Am. Jour. Pharm., 1892, 236; from. Chem. News, 1892, lxv., 122.

*Solutions—Nature.*—See also the papers of Picton and Linder on Hydrosulphides and Solution of Sulphides.

*Solutions—Rapid Method in the Cold.*—J. B. Coleman found that by simply passing a current of air through the coarsely powdered material suspended in water, complete solution is obtained in a very short time. With readily oxidizable substances air must be replaced by coal gas, care being taken that the oxygen and carbonic anhydride present in the gas are thoroughly absorbed by alkaline pyrogallol solution.—Jour. Chem. Soc., 1892, lxii., 397, from Jour. Soc. Chem. Ind., 1892, 231–233.

*Solutions—Separation of Solids or Liquids from their Solution in Alcohol, Ether or Chloroform, without Evaporation.*—C. Weitenkampf has patented an apparatus which enables him to regain substances from their solution in any of the above-mentioned solvents by subjecting the solution to a low temperature, and simultaneously saturating it with carbonic acid gas at a pressure of three atmospheres, and in this way avoiding evaporation. The separated substances (floating or deposited) are drawn off in any suitable way.—Chem. Zeitg., 1891, 1127.

*Titrating Dark Alkaline Solutions.*—Buisson titrates a mixture of 25 c.c. of the liquid to be examined, one drop of exactly neutralized solution of rosolic acid, and 10 c.c. of pure neutral ether with sulphuric acid, stirring or shaking well after each addition, and allowing the ether to separate. As soon as the alkali has been neutralized, the rosolic acid is liberated and dissolves in the ether, which coloration, of course, will be noticed at once. —Chem. Zeitg., (Rep.) 1892, 76, from Bull. Ass. Chim., 1892, ix., 597.

*Colloidal Solutions—Nature.*—In continuation of their investigations of the nature of solution (see *Hydrosulphides* and *Sulphides*), Picton and Linder have also studied the colloidal solutions, and give as the results arrived at:

There is a continuous series of grades of solution passing without break

from suspension to crystallizable solution. We can pass from solution in which the particles are visible under the microscope to those in which they are invisible, but indiffusible, and then to those invisible and diffusible. The very finely divided particles in the lower grades of solution are simply large molecular aggregates retaining many of their molecular properties. In passing up the series through the different grades of solution, these aggregates become smaller, or, at least, consist of a smaller number of molecules, and the forces by which they are held in solution become more definitely those of chemical attraction. Certain solutions possess a peculiar property which consists in the repulsion of the dissolved substance as *an unaltered whole* from one of the electrodes of a battery, if these be immersed in the solution.—Journ. Chem. Soc., 1892, lxi. (Trans.), 148–172.

*Colloidal Solutions—Nature.*—C. Barus and E. A. Schneider arrive at the conclusion that colloidal solutions consist of very finely divided matter, which is held in suspension in the solvent. Silver being an excellent conductor of electricity, a measurement of the resistance of a solution of colloidal silver should aid in determining whether the silver particles are held mechanically in suspension in the solution or are in the dissolved state. In the first case, the liquid would be a non-conductor, in the second, metallic conductivity might be expected. The experiments show that colloidal silver is a non-conductor.—Jour. Chem. Soc., 1891, 1413, from Zeits. physikal. Chem., 1891, 278–298.

*Spectra, Terminal—In Vacuo.*—E. E. Brooks.—Chem. News, July 17, 1891, 30.

*Spectra of the Elements of the Second Periodic Group.*—By H. Kayser and C. Runge.—Jour. Chem. Soc., Sept. 1891, 965, from Ann. Phys. Chem. (2), xliii., 385–409.

*Spectra and Mendelejeff's System.*—H. Kayser has a very interesting article on the relation which exists between the spectra of the elements and Mendelejeff's system, which can not be abstracted intelligibly. Reference must therefore be had to Chem. Zeitg., 1892, 533.

*Stereochemistry.*—For a succinct account of stereochemistry, see Pharm. Jour. Trans., July 1891, 41–44. Also a paper by T. P. Blunt, same journal, Nov. 1890, 397–400.

*Test Paper.* See *Charta.*

*Thermometer, Areometer,* etc. See under "General Pharmacy."

## ANALYSIS.

*Qualitative Analysis—Dry Reactions.*—W. Tate advocates the systematic application of dry reactions, employing the moist group precipitates, obtained in the ordinary manner, for the purpose; groups II. and III. being subdivided respectively into the copper and arsenic and the zinc and iron sub-groups. For instance: Group I. precipitate is examined, (*a*) for

mercury, by heating a minute quantity on a thread in the upper reducing flame of a Bunsen and beneath a cooled porcelain surface, the sublimate being converted into iodide for confirmation; (*b*) for lead, by heating on charcoal until the mercury is dissipated, and heating any residue strongly with potassium iodide and sulphur; (*c*) for silver, by obtaining bead on charcoal, and so on.—Journ. Chem. Soc., Aug. 1891, 959, from Chem. News, lxiii., 86; Pharm. Record, 1891, xii., 455.

*Analysis—Combination of Wet and Dry Methods.*—W. E. Adeney and T. A. Shegog have endeavored to elaborate a scheme of Plattner's, by which it is possible to separate the reducible from the non-reducible oxides by the dry method, and then examine each separately by the wet method, thus much simplifying the analysis, especially of minerals. Briefly stated: The substance is mixed with sodium carbonate, fused borax and silver chloride (with some oxides it is preferable to leave out the silver chloride, and after fusion add a small button of silver to take up the minutest quantity of reduced metal), and fused before the blow-pipe on charcoal. After cooling the metallic end, glass beads are carefully detached, and separately examined by the wet method.—Chem. News, 1891, lxiv., 174, 185, 192.

*Analysis—Unsatisfactory Test for Oxides and Hydrates.*—W. B. Cowie points out that a frequently adopted method of testing for insoluble oxides or hydrates is liable to erroneous interpretation. In testing as usual, a solution of ammonium chloride is added to the substance in a test tube, the mouth of which is covered with a piece of moist red litmus paper, and heat is applied, when ammonia will be set free in the presence of oxides or hydrates, which will then change the color of the litmus paper to blue. Cowie finds that by heating the solution of ammonium chloride by itself the red changes to blue. On the contrary, when replacing the litmus paper by phenolphthalein paper, no reaction takes place, indicating that no free ammonia is present, but on adding the smallest trace of either oxides or hydrates the paper is instantly colored purplish-red.—Pharm. Journ. Trans., Nov. 1891, 442.

*Volumetric Analysis—With Potassium Iodate.*—Max Groeger points out that potassium iodate, which can easily be prepared in a state of perfect purity, contains no water of crystallization, is permanent in the air, and fulfils every condition which can be expected of an ideal basis for volumetric work.

An aqueous solution of the salt must be perfectly neutral to litmus, and must remain colorless when tested with starch and dilute sulphuric acid.

The use of the salt in the preparation of accurate volumetric solutions is very simple.

*Iodometric Solution.*—About 0.15 gm. of the iodate (powdered) is dried at 100° C.; after drying in the exsiccator, it is exactly weighed, dissolved

in a little water, mixed with about six times its quantity of pure potassium iodide and an excess of pure hydrochloric acid, and a previously prepared solution of $\frac{1}{10}$ normal hyposulphite of sodium (but which may be a little stronger than $\frac{1}{10}$ normal) gradually added from a burette, gelatinized starch being used as indicator. According to the equation,

$$\underset{\text{pot. iodate.}}{KIO_3} + \underset{\text{pot. iodide.}}{5KI} + \underset{\text{hydrochloric acid.}}{6HCl} = \underset{\text{pot. chloride.}}{6KCl} + \underset{\text{water.}}{3H_2O} + \underset{\text{iodine.}}{I_6}.$$

6 atoms of iodine correspond to 1 molecule of potassium iodate; that is [according to the atomic weights used by the author], 126.54 gm. of iodine correspond to 35.575 gm. of iodate. Supposing, then, that we had employed $x$ gm. of potassium iodate, and that, of the hyposulphite solution, $y$ cubic centimeters had been consumed, each cubic centimetre of the latter will indicate $\frac{126.54\ x}{35.575\ y}$ of iodine, or $\frac{35.569 \times x}{y}$.

The liberated iodine is then titrated with the previously standardized hyposulphite, and the amount of hydrochloric acid present then calculated, after which the acid solution is brought to the proper volume. On the basis of this $\frac{1}{10}$ acid, a $\frac{1}{10}$ alkali solution is easily prepared.

For preparing so-called volumetric solutions, it is only necessary to take ten times the quantity of iodate and iodide above mentioned, and to use an acid ten times stronger.—After Zeitsch. f. angew. Chem.; Am. Drug., July 1891, 224.

*Analysis—Organic.*—Berthelot discards the cupric oxide, and uses instead oxygen, compressed to 25 atmospheres. The combustion is said to be instantaneous and complete, and the percentage of carbon can be estimated with much greater precision and dispatch.—Chem. Drug., March 1892, 412.

*Micro-Chemical Analysis.*—Although petrographists of late years have been using the microscope quite extensively in their investigations, in fact cannot do without it, the analytical chemist regards its usefulness to him as doubtful, chiefly because of some fancied difficulty in using it properly, and then because most of the micro-chemical reactions hitherto known are incomplete and somewhat unsuitable. H. Behrens, in a series of articles, endeavors to show the great assistance which the microscope may render him. A suitable micro-chemical reaction must require a minimum of material, a minimum of time, trustworthiness, and a magnifying power not exceeding about 200 diameters. This will exclude several otherwise reliable tests. For the particulars, as they apply to the individual chemicals, the readers are referred to the original articles.—Chem. News, 1891, lxiii., 294, 303; lxiv., 5, 32, 40, 52, 64, 76, 110, 122, 149, 159, 173, 183.

*Micro-Biochemical Analysis.*—M. W. Bayernick has published a method of analysis for the determination of organic and other substances in liquids

which promote the growth of bacteria. This analysis is based on the fact that bacteria are largely selective in their food; roughly stated the "analysis" consists in sterilizing the respective liquids by heat, and adding a pure culture of the selected bacterium, allowing to develop, and examining the result of the growth. There are many difficulties to surmount yet before this method becomes fairly reliable. For particulars reference must be had to the original paper in Centralbl. Bacteriologie u. Parasit., 1891, Nos. 22, 23.—Apoth.-Zeitg., 1892, 48.

*Powdered Drugs—Analysis.*—In the following table Dieterich has given the average percentage of water, ash and potassium carbonate of several drugs:

| Powder. | Water. | Ash. | Potassium carbonate calcul. for the ash and substance. | |
|---|---|---|---|---|
| Cantharides | 5.9–9.5 | 6.45–8.50 | | |
| Chrysanthemum flowers | 5.55–7.95 | 6.35–6.75 | 35.27 | 2.24 |
| Alex. Senna | 5.05–8.30 | 11.35–14.30 | 13.28 | 1.90 |
| Tinn. Senna | 6.90–10.95 | 11.15–12.50 | 13.76 | 1.72 |
| Conium leaves | 12.40 | 13.05 | 26.4 | 3.45 |
| Digitalis | 7.05–11.60 | 7.55–7.95 | 38.99–47.97 | 3.10–3.79 |
| Hyoscyamus | 9.70 | 23.05 | 22.42 | 5.17 |
| Althaea root | 6.20–9.10 | 5.80–6.05 | 17.02 | 1.03 |
| Orris root | 3.60–7.60 | 3.55 4.90 | 21.02 | 1.03 |
| Licorice root | 6.45–9.80 | 5.20–6.15 | | |
| Rhubarb | 5.85–6.45 | 11.15–12.25 | 8.40 | 1.03 |
| Ergot (freed fr. oil) | 7.85–10.00 | 5.05–5.60 | | |
| Fennel | 9.95–13.55 | 7.95–9.05 | traces | |

—Apoth.-Zeitg., Rep., 1891, 87, from Helfenberg. Annalen.

*Alkaloidal Assay of Narcotic Plants.*—O. Schweissinger states that his old method, published some years ago, gives uniformly accurate results. He proceeds as follows:

Ten grammes of the finely cut dry herb (aconite, belladonna, etc.) are put into a flask, digested (warm) over night with 200 c.c. of water containing 1 c.c. of diluted sulphuric acid, the mixture being occasionally agitated. Flask and contents having been weighed as soon as the latter had been introduced, any loss of weight which the apparatus has suffered during standing is made good by adding enough water to restore the original weight. The mixture is then allowed to cool, strained, the residue pressed, and the strained liquid measured. It will measure, say, 180 c.c. (which would correspond to 9 gm. of herb). [The author evidently pays no attention to any possible increase of volume due to the solution of extractive matter in the liquid.—Ed. Am. Drugg.] The above-mentioned amount is now evaporated on the water bath under constant stirring, during which time the temperature is conveniently kept at 65° C. (149° F.). When the residue weighs about 20 gm. the thin fluid extract is poured

into a measuring cylinder or flask of the capacity of 100 c.c., and alcohol then added up to the mark (100), which causes precipitation. The whole is then thoroughly shaken. (Without this precipitation by alcohol the subsequent treatment with chloroform or ether-chloroform, by shaking with these menstrua, becomes impossible, owing to the formation of emulsions.)

The evaporation may also be continued down to about 10 c.c., and alcohol then added to 50 c.c. In this case, however, the sediment settles much slower and filtration is more difficult.

After the sediment has been deposited the liquid is filtered. A measured portion of the filtrate is evaporated to 10 c.c., transferred to a separatory funnel, 1 c.c. of ammonia water added, and shaken with 40 c.c. of ether-chloroform (15 c.c. of chloroform + 25 c.c. of ether). Twenty cubic centimeters of the ether-chloroform solution are then removed, evaporated in a capsule, and titrated with one-hundredth normal acid.

The results obtained by the author are interesting also to us, since they show the average yield of alkaloid under several conditions.

| | Amount of Alkaloid in the Air Dry Herb. | Amount of Alkaloid in the Anhydrous Herb. | Amount of Water in the Herb. |
|---|---|---|---|
| Aconite herb, 1 year old, cultiv. | 0.360 | 0.417 | 13.55 |
| " wild (1890) | 0.496 | 0.585 | 15.2 |
| " cultiv. (1890) | 0.496 | 0.602 | 17.74 |
| Belladonna leaves, 1 year old, cultiv. | 0.189 | 0.209 | 12.5 |
| " wild (1890) | 0.309 | 0.402 | 23.25 |
| " cultiv. (1890) | 0.132 | 0.172 | 23.5 |
| Hyoscyamus leaves, wild (1890) | 0.072 | 0.085 | 15.4 |
| " cultiv. (1890) | 0.063 | 0.070 | 9.85 |
| Stramonium leaves, wild (1890) | 0.289 | 0.319 | 9.6 |
| " cultiv. (1890) | 0.231 | 0.255 | 9.5 |

—Am. Drug., 1891, 351, from Pharm. Centralh.

*Viscosity—Nature of.*—G. Kraemer and A. Spilker, from theoretical considerations, are led to the conclusion that the viscosity of certain substances depends upon the number of methyl groups contained in them. On starting from allyl alcohol, subjecting it to the action of methylated benzols such as pseudocumol (xylol), they obtained an oil the viscosity of which was 700 degrees, while the best Russian lubricating oil is only 40 degrees. That methyl groups have a direct bearing upon viscosity, is probable from other observations. Methyl alcohol is the starting point of the fatty acid series; the higher we ascend, and the more numerous the methyl groups become, the denser and more viscid become the compounds.

The viscosity is measured by the viscosimeter, in which the rapidity, or

rather slowness, with which oils pass out from a reservoir through a small tube may be accurately determined by seconds. The standard of comparison is pure water, the rate of flow of which is put at 1; by dividing the number of seconds the oil in question requires, by the number of seconds which water requires, the degree of viscosity is obtained—same quantities being supposed.—Am. Drug., 1891, 335, from Ber., 1891, xxiv., 2785.

# INORGANIC CHEMISTRY.

## OXYGEN.

*Atomic Weight.*—According to the experiments of A. Leduc, the density of oxygen is 1.1050 (hydrogen, 0.0695), which would make its atomic weight 15.905.—Chem. News, 1891, lxiv., 84, from Comptes rendus, July 1891, cxiii.

*Estimation of Available Oxygen in Peroxides.*—L. L. DeKoninck and A. Lecrenier make use of a modification of a method of Bunsen. The oxide is placed in a flask along with sufficient water to dissolve the chloride formed during the ensuing reaction, and while gently heated, is submitted to the action of hydrogen chloride, conveyed in a current of carbonic anhydride; as soon as the oxide is dissolved, the supply of hydrogen chloride is stopped, but the current of carbonic anhydride is continued, and when the hydrogen chloride has been expelled, the liberated iodine in the receiver is titrated in the usual manner.—Journ. Chem. Soc., Sept. 1891, 1136, from Chem. News, lxiii., 280.

——— *Estimation.*—T. Koenig calls attention to the impossibility of getting satisfactory results with Schuetzenberger's process unless the indigo-carmine is of good quality.—Jour. Chem. Soc., 1892, lxi. (Abstr.), 98; from Zeits. angew. Chem., 1891, 110.

——— *Estimation in Water.*—Schuetzenberger's method with sodium hyposulphite and indigo carmine gives results which differ 35 per cent. from the mean value, and the time in titration has a great influence upon the results. Roscoe and Lunt, in endeavoring to avoid these drawbacks (see Proceedings 1890, xxxviii., 509), made the apparatus they employed so complicated and so unportable as in a great measure to render their method unsuitable for technical use. Matthew A. Adams has designed an apparatus which allows of the easy and accurate volumetric estimation of oxygen in water. The essential principle of his method is that the water under examination, from first to last, shall be kept beyond the possibility of contact with any gaseous medium whatever, and the essential feature of his apparatus is that the whole process is conducted in a closed glass vessel, into which the water, together with the necessary reagents, is admitted,

but to the entire exclusion of any kind of atmosphere. For particulars reference must be had to the original article.—Jour. Chem. Soc., 1892, Trans., lxii., 310–322.

——— W. Kisch has compared the methods of Bunsen-Tiemann, Mohr, Schuetzenberger-Risler and Winkler, and finds that the latter method is the safest, most trustworthy and the easiest in manipulation. Winkler's method is as follows: Mix the water with manganous chloride, and then with potassium iodide and potassa. The precipitated manganous hydroxide rapidly absorbs the oxygen. On adding hydrochloric acid, iodine is liberated, which is estimated by sodium hyposulphite.—Jour. Chem. Soc., 1892, lxi. (Abstr.), 89; from Zeits. angew. Chem., 1891, 105–108.

——— *Absorbent in Gas Analysis.*—L. L. de Koninck has discovered that an alkaline solution of a ferrous salt absorbs oxygen promptly and completely from gaseous mixtures. It is prepared as follows:

Three different solutions are made, each measuring 100 c.c.; the first (*A*) containing 40 gm. of crystallized ferrous citrate; the second (*B*) 30 gm. of Rochelle salt; and the third (*C*) 60 gm. of commercial caustic potassa.

These solutions must be mixed in a special manner, viz., 1 volume of *A* is poured into 5 volumes of *B*, causing a copious, whitish precipitate of ferrous tartrate. Next 1 volume of *C* is added, which causes the precipitate to redissolve.

The resulting solution is light-yellowish, and when exposed to air turns green in consequence of the formation of a ferroso-ferric salt.—Am. Drug., 1891, 271; from Chem News, lxiv., 45.

——— *Gasometric Determination in Gaseous Mixtures.*—L. L. de Koninck.—Chem. News, July 24, 1891, 45.

——— *Color.*—According to Olszewski, liquid oxygen in layers of greater thickness than 15 mm. has a distinctly blue color by transmitted light. As special precautions were taken in purifying the gas, and the absence of ozone was ascertained by special tests, there seems no reason to doubt that the color observed is characteristic of oxygen in the liquid state.—Journ. Chem. Soc., July 1891, 773, from Ann. Phys. Chem. (2), vol. 42, 663.

*Oxygen—Manufacture.*—The American Druggist, 1892, 145, contains an illustrated article on the manufacture of oxygen by the "Brin" process. This process is based upon the fact that barium monoxide, when heated to low redness, is capable of absorbing oxygen and becoming converted into a dioxide, and that at a higher temperature this oxygen is given off, and the dioxide again reduced to a monoxide. This process is apparently a purely mechanical one, baryta acting much in the capacity of a sponge (as the latter absorbs water and gives it up again on pressure, so the baryta absorbs oxygen and gives it up on increasing the heat and in a vacuum).

The oxygen is compressed into weldless steel cylinders, varying in capacity from 10 to 125 cubic feet, at a pressure of 120 atmospheres, or 1800 pounds per square inch. A cylinder measuring 7 inches in diameter by 48 inches in length contains 100 cubic feet of gas, and weighs only 90 pounds.—See Proceedings 1885, xxxiii, 208.

——— *Preparation.*—Joseph W. England states that, although oxygen gas may be obtained commercially in steel cylinders containing 100 gallons of compressed gas, as good a product can be obtained far cheaper with one of the different oxygen apparatus now on the market. After describing his apparatus, the generator of which consists of two copper tubes joined in an elbow, in the horizontal of which the gas mixture is heated, and the upright one connects with the wash-bottles, the first two of which contain a solution of sodium hydrate, 90 grains in ten fluidounces of distilled water, the third and fourth contain a solution of silver nitrate, 15 grains in ten fluidounces of distilled water, and the last bottle is filled with absorbent cotton to dry the gas, which is then passed into rubber bags, closed by a vulcanite stop-cock. The mixture for generating the gas is composed of powdered potassium chlorate (English brand), four pounds; manganese dioxide (Russian), one pound, and precipitated ferrous carbonate, sixty grains. Mix and triturate well in a wedgewood or porcelain mortar, avoiding force or severe concussion. Sift several times through a moderately fine sieve, and dry in a moderately heated oven, leaving the door open. The ferrous carbonate is stated to absorb any chlorine, which, although theoretically correct, practically is of little use, because the carbonate soon changes from the ferrous to the ferric state; England has left it out as useless. The solutions in the wash-bottles must be renewed from time to time, generally after about 300 gallons of oxygen have passed through it.—Am. Journ. Pharm., 1892, 11–14.

——— *Preparation.*—Kassner found that oxygen is evolved from barium peroxide by the action of certain salts, especially potassium ferricyanide (see Proceedings 1891, xxxix., 473). Kwasnik finds that all metallic salts, except those of the alkaline metals, possess the same property.—Pharm. Zeitg., 1891, 733.—Jour. Chem. Soc., 1892, lxii., Abstracts, 408, from Ber., 1892, xxv., 67–70.

——— *Preparation.*—In order to prevent the too violent evolution of oxygen from potassium chlorate and peroxide of manganese, Landolt proposes an addition of potassium chloride.—Zeits. analyt. Chem., 1892, 200, from Berg. u. Huettenm. Zeitg., xlix., 428.

——— *Preparation.*—Zinno objects to Kassner's process (from potassium ferricyanide and barium peroxide) that the oxygen obtained is far from pure, containing noxious organic products. He therefore recommends to replace the ferricyanide by the permanganate, as follows: 200 gm. of dry permanganate of potassium are mixed with 200 gm. of per-

oxide of barium; on the addition of water (without any heating) are evolved 13 litres and 650 gm. of oxygen. No injurious volatile by-products are formed.—Pharm. Post, 1891, 938, from Rép. de Pharm.

——— *Preparation on a Large Scale.*—E. Peitz has patented a process by which he claims to obtain oxygen economically. He allows air to pass over a heated mixture of lime and oxide of lead, and decomposes the formed calcium plumbate with carbonic acid. $2CaO + PbO + O = PbO_4Ca_2$ and $PbO_4 + 2CO_2 = 2CaCO_3 + PbO + O$.—Pharm. Zeitg., 1892, 18.

*Ozone—Detection.*—P. Cazeneuve makes use of metaphenylenediamine. A solution of 1 part of the hydrochlorate of this base in 100 parts of 93 per cent. alcohol, to which a few drops of ammonia are added. If this reagent is exposed to the air, or to a current of oxygen for many hours, it takes a slightly greenish-blue tint. A few drops of hydrogen peroxide color it intensely blue in the cold in a few minutes.—Chem. News, 1891, lxiv., 125, from Bull. Soc. Chim., v.

——— *Physiology.*—D. Labbé and M. Oudin state that ozone prepared by the chemical method is always impure, being accompanied by highly poisonous compounds, as for instance phosphorous acid. If it is prepared from pure oxygen there are obtained considerable quantities, which, being mixed with unconverted oxygen, constitute a mixture dangerous to breathe in a confined space. Mixed with atmospheric air ozone is not dangerous. —Chem. News, 1891, lxiv., 74, from Comptes rend., cxiii., July 1891.

## HYDROGEN.

*Hydrogen—Metallic Nature.*—A. H. Allen, in one of his lectures, mentioned a hypothetical element which he provisionally named "Hudorium" (Hd), and which according to its characters and general behavior, should find its place among the metals. He spoke of "Hydrogen."—Chem. Drug., Jan. 1892, 103.

*Hydrogen—Evolution from Zinc and Sulphuric Acid, Influenced by Mercuric Chloride,* see under *Hydrargyrum.*

*Hydrogen Sulphide.*—See under *Sulphur.*

*Water—Analysis of Potable.*—J. Alfred Wanklyn again calls the attention to the changes which waters undergo if kept for some time prior to analysis. The "free" ammonia decreases, and the "albuminoid" ammonia increases. Hence the interval between sampling and analysis becomes an important datum if different waters are to be compared.—Chem. News, July 17, 1891, 36. [Compare a paper by Miguel on the multiplication of micro-organisms in Proceedings A. Ph. A., vol. xxxvi., 414.—*Reporter.*]

——— *Scheme for Analysis.*—The following scheme, a modification of that of Th. Stillman (Chem. News, 1890), deserves to be given here in full:

Evaporate 2 liters of the water in a platinum capsule gradually on a water bath to dryness, place the capsule in a drying oven, heat during half an hour to 105° C., and weigh the residue (A).

Next heat the capsule to dull redness, cool and weigh again the residue (B).

The loss of weight between A and B represents the organic and volatile constituents.

Next warm the residue B with 15 c.c. of strong hydrochloric acid, add 25 c.c. of distilled water, heat to boiling, and filter, through an ash free filter, into a 100 c c. flask, wash the filter containing residue C well, and make up the filtrate (*c*) with water to 100 c.c.

The residue C upon the filter consists of insoluble matter, silica ($SiO_2$), aluminum silicate ($SiO_2Al_2O_3$), or calcium sulphate ($CaSO_4$). It is dried, ignited, and weighed, next fused with soda in a platinum crucible, taken up with water, acidified with hydrochloric acid, and evaporated to dryness. The residue is again treated with water and filtered, yielding residue D and filtrate *d*.

The residue D is silica ($SiO_2$). It is ignited and weighed as $SiO_2$.

The filtrate *d* is rendered alkaline with ammonia, heated to boiling, and filtered, yielding residue E and filtrate *e*.

Residue E consists of alumina ($Al_2O_3$) and ferric oxide ($Fe_2O_3$). It is dried, ignited, and weighed, the result being given as alumina *and* ferric oxide.

The filtrate *e* is rendered alkaline with ammonia; after three hours the precipitate, consisting of lime (CaO), is collected on a filter, dried, ignited and weighed. It is calculated into calcium sulphate ($CaSO_4$).

The filtrate *c*, amounting to 100 c.c., is divided into two portions, one of 75 c.c. (portion $c_1$), and the other of 25 c.c. (portion $c_2$.)

The larger portion ($c_1$) is rendered alkaline by ammonia, heated to boiling, and filtered. There is obtained residue F and filtrate *f*. All weights finally obtained from this portion are multiplied by $\frac{4}{3}$ to get amount corresponding to 100 c.c.

The residue F consists of alumina ($Al_2O_3$) and ferric hydrate ($Fe_2O_3$). It is dried, ignited, and weighed together.

Filtrate *f* is rendered alkaline with ammonia, allowed to stand three hours, and then filtered. We obtain residue G and filtrate *g*.

Residue G consists of lime (CaO). This is dried, ignited, and weighed as CaO.

Filtrate *g* is evaporated to dryness in a platinum capsule, ignited (to drive off salts of ammonia), then boiled with water, the liquid filtered, and the filter well washed. We obtain residue H and filtrate *h*.

Residue H consists of magnesia ($Mg(OH)_2$). This is dried, ignited and weighed as magnesia (MgO).

Filtrate *h* is transferred to a platinum capsule, a few drops of sulphuric

acid added, the whole evaporated to dryness and ignited to a constant weight. The residue consists of sodium, potassium, or magnesium sulphate. It is first weighed, then dissolved in water, the solution made to measure 50 c.c., and then divided into two equal portions (*a* and *b*) of 25 c.c. each.

Portion *a* is mixed with a few drops of hydrochloric acid, then rendered alkaline with ammonia and mixed with sodium phosphate solution. After three hours the precipitate is collected on a filter, well washed, dried, and ignited. The residue is magnesium pyrophosphate ($Mg_2P_2O_7$). This is calculated into magnesium sulphate ($MgSO_4$). The amount found is multiplied by 2, and then deducted from the total amount of the sulphates found in filtrate *h*. Finally, the amount of $MgSO_4$ [corresponding to the 50 c.c. of filtrate *h*] is calculated into magnesia ($MgO$).

Portion *b* is rendered faintly acid with hydrochloric acid and mixed with platinic chloride solution. The whole is evaporated, after addition of some alcohol, on the water-bath to dryness, the residue treated with alcohol and filtered, so that the potassio-platinic chloride ($K_2PtCl_6$) is collected on the filter, upon which it is washed, dried at 100° C., and weighed. The weight found is calculated into potassium sulphate ($K_2SO_4$). It is multiplied by 2, and then deducted from the weight of potassium *and* sodium sulphate previously found in filtrate *h* (after deduction of the magnesium salt). The remainder is sodium sulphate ($Na_2SO_4$). Lastly, both the potassium and the sodium sulphates are calculated into potassa ($K_2O$) and soda ($Na_2O$).

The smaller portion ($c_2$) of filtrate *c*, amounting to 25 c.c., is heated to boiling, mixed with barium chloride solution, allowed to stand three hours, then the barium sulphate separated by filtration, washed, dried and weighed. The amount is calculated into anhydrous sulphuric acid ($SO_3$), and multiplied by 4.

Carbonic acid in the original water is found by combining (by calculation) the chlorine and sulphuric acid with the bases, and then ascertaining how much carbonic acid is required to convert the remainder of lime and magnesia into carbonates (see below).

Chlorine is determined in the following manner: 250 c.c. of the water are evaporated to about 50 c.c. in a porcelain capsule. A few drops of solution of yellow potassium chromate are added, and the chlorine determined by titration with decinormal silver solution (1 c.c. = 0.0017 gm. $AgNO_3$).

*Notes.*—The chlorine in the water is most likely combined with sodium. If there is more present than can be in combination with sodium, it may be combined with potassium, magnesium or calcium. Sulphuric acid is considered as being in combination with alkali metals, unless these are already fully engaged by the chloride. In this case the sulphuric acid is reckoned to be in combination with magnesium or calcium. After all these combinations are calculated, the residuary calcium and magnesium

are considered as combined with carbonic acid. The following tables show the quantities of the several constituents found in a certain water, and the combinations into which they were finally calculated:

*Found.*

| | Gm. in 1 Litre. |
|---|---|
| $SiO_2$ | 0.0038 |
| $SO_3$ | 0.0110 |
| Cl | 0.0062 |
| $K_2O$ | 0.0033 |
| $Na_2O$ | 0.0185 |
| MgO | 0.0165 |
| CaO | 0.0466 |
| $Al_2O_3+Fe_2O_3$ | 0.0020 |
| Organ. Matter | 0.0246 |
| $CO_2$ | 0.0530 |
| | 0.1855 |
| O in excess, corresponding to Cl | 0.0021 |
| Total | 0.1834 |

*Calculated into:*

| | |
|---|---|
| Sodium chloride, NaCl | 0.0154 |
| Sodium sulphate, $Na_2SO_4$ | 0.0141 |
| Potassium sulphate, $K_2SO_4$ | 0.0061 |
| Calcium carbonate, $CaCO_3$ | 0.0833 |
| Magnesium carbonate, $MgCO_3$ | 0.0338 |
| Alumina + Ferric oxide, $Al_2O_3 + Fe_2O_3$ | 0.0020 |
| Silica, $SiO_2$ | 0.0038 |
| Organic matter | 0.0246 |
| Total | 0.1831 |

—Am. Drug., 1891, 265.

*Water—Recognition of the Neutrality.*—F. Milius and F. Foerster make use of iod-eosine in the presence of ether as the most sensitive test for minute quantities of alkali, which enabled them to prove that water in contact (even for a comparatively short time) with glass dissolves sufficient of the alkali to act upon the iod-eosine. For information as to the use of the iod-eosine see under "*Acidimetry*."—Chem. News, 1891, lxiv., 228, 240, 254, 266, 277, 288; from Ber., 1891, xxiv., 1482–1498.

——— *Tests for Impurities.*—F. J. Wulling gives the following simple directions for testing drinking water, which any pharmacist can easily apply. The substances to be looked for primarily are organic matter, albuminoids, ammonia, nitrates and nitrites.

1. For organic matter, put a little of the sample into a beaker, add 2 or 3 drops of dilute sulphuric acid, and color distinctly with a solution of permanganate of potassium. If much organic matter is present, the color of the permanganate becomes discharged almost immediately; if less or very

little, it takes longer to decolorize. If the color has not changed in 25 or 30 minutes, it is safe to assume that organic matter was not present. This is a tolerably reliable test.

2. For nitrites, a little sulphuric acid added to the water forms nitrous acid if nitrites are present, which is easily detected by its power of liberating iodine from iodide of potassium. A little starch paste is mixed with a small quantity of a solution of potassium iodide, and the mixture added to the suspected water containing the sulphuric acid. If nitrites were present the nitrous acid formed liberates the iodine from the iodide, which turns blue with starch. This indirect method is a ready means for detecting the nitrites if present in not too small a quantity.

3. Nitrates are detected by converting into nitric acid, which turns morphine red. A portion of the water is evaporated to dryness, the residue treated with a drop of strong sulphuric acid, and a portion of morphine added. If nitrate was present the morphine gives red color.

4. For ammonia, Nessler's reagent is by far the best test. It may be made by dissolving 18 grains of oxide of potassium in a little water, adding solution of mercuric chloride until the red iodide of mercury first formed redissolves upon agitation. To this is added a solution of 50 grains of caustic potassa and distilled water to make 8 ounces.

This reagent will detect 0.00375 of a grain in a pint of water by giving a yellow color. A reddish color or precipitate forms with larger quantities of ammonia.

5. Albuminoid matter requires a more elaborate proceeding for its detection. If all of the above were found, it is hardly necessary to go to the trouble of looking for albuminoids; the water would be unwholesome even if they were not present. If it is desired to test for them, nevertheless, Chapman and Waukly's test is the simplest to employ. If the water was found to contain ammonia, the latter must first be removed, as must also any urea that may be present. This is best done by distilling the water until it gives no reaction with Nessler's reagent. Then add a strong solution of caustic potash and potassium permanganate, and examine again for ammonia.—Pharm. Record, 1891, xii., 222.

——— *Detection of Sewage.*—P. Griess dilutes paradiazobenzol-sulphuric acid with 100 parts of water, and adds a little soda solution in excess. The water is placed in a tall cylinder, holding about 100 c.c. which stands before a window upon a white surface. To the water are then added 2 to 4 drops of the diazo-solution, and the whole well stirred up. If no change of color takes place within five minutes, we may infer almost entire absence of organic excretions, or products of decomposition. A more or less yellow color shows the presence of quite considerable quantities of such matter. Normal human urine (1 : 5000) and urine of horses (1 : 50,000) can be detected.—Chem. News, 1891, lxiv., 233, from Ber., 1891, xxiv.

——— *Purification by Metallic Iron.*—Dr. H. Leffmann recommends what is known as the Anderson process, in which metallic iron is kept in constant motion in a suitable container through which water is passed, air being also in contact. In Antwerp this process has been in use for six years, and they are enabled to purify water in from 4 to 5 minutes for moderately bad water, and in 5 to 15 minutes for water containing sewage. As for microbes, a quantity containing 100,000 microbe colonies was reduced to an average of 5 colonies.—Pharm. Record, 1891, xii., 119.

——— *Purification.*—A. R. Leeds delivered an address in Rochester, N. Y., on the purification of water, in the course of which he explains the seeming impossibility of a filter bed, consisting of only two feet of sand, to free the water not only from the mud and dirt, but also from the dangerous bacteria. Comparatively few of the bacteria found in water are dangerous to health; the great bulk of them are our greatest friends. It is through their aid, together with the oxygen of the air, that the filth of the water is destroyed; they feed not only upon it, but also upon each other. After a filter bed has been in use for some time, the bacteria form at the top and between the particles of sand a sort of jelly or slime; the injurious bacteria in the water to be filtered are consumed by this slime. He stated that water containing 100,000 bacteria to the c.c., after passing through such a bed, contains seldom more than 40 or 50, depending on the slowness with which the water passes through.—Chem. News, 1892, lxiv., 6.

*Water—Fallacy of Purification by Freezing.*—According to W. P. Mason, of fifteen samples of water containing organic impurities, the percentage retained by the ice varied from 7.14 to 75.75 per cent., with an average of 34.3 per cent., while of eighteen waters holding mineral impurities, the ice retained from a trace to 53.20 per cent. with an average of 21.2 per cent.—Pharm. Era, 1892, 303, from Jour. appl. and analyt. Chem.

*Chalybeate Waters, Containing Free Sulphuric Acid.*—The mineral waters of Rennes-les-Bains (Aude, France), which contain ferrous, aluminum, calcium, magnesium, and sodium sulphates, and sodium chloride, have a powerfully acid reaction, due to the presence of 1.17–17.01 parts of free sulphuric acid in 100,000 parts of water.—Jour. Chem. Soc., 1891, 1440, from Comptes rend., cxiii., 87.

*Mineral Waters—Estimation of Free and Combined Carbonic Anhydride.*—To 50 c.c. of the mineral water two or three drops of phenolphthalein is added, and the standard potash solution is run in very slowly toward the end, until the last drop gives a persistent rose tint. The quantity of free carbonic anhydride is double the equivalent of the potash used. If standard potassium carbonate solution is used, then one equivalent is the measure of the free carbonic anhydride. Two or three assays should

be made, and the mean result, omitting the first one (which always is too little), should be taken. The amount of solution required by the first assay is added at once in the second assay, and more added with gentle stirring, so as to avoid all possible loss of free gas. The total carbonic anhydride is now estimated by adding standard sulphuric acid to the solutions just obtained until a slight excess is present—the solution being boiled to expel the free gas, and the excess of acid titrated back with standard potash.—H. Bretet, Jour. Chem. Soc., July 1891, 862, from J. Pharm. (5), xxiii., 339.

*Mineral Waters—Collection of Formulas.*—See under *Aquæ.*

*Water—Estimation of Nitric and Nitrous Acids.*—See under *Nitrogen.*

*Water—Estimation of Oxygen.*—See under *Oxygen.*

*Hydrogen Peroxide—Properties—Tests and Uses.*—Dr. C. Krauch, in his revised work on Reagents, gives the following description, tests and notes on hydrogen peroxide:

"*Hydrogen Peroxide.*"—A clear, limpid, very faintly acid liquid, containing about 3 per cent. of hydrogen peroxide [$H_2O_2$], and strongly effervescing when mixed with solution of permanganate of potassium, the latter at the same time losing its color.

*Tests for Impurities.*—Sulphuric acid: Dilute 10 c.c. of hydrogen peroxide with 50 c.c. of water, add to the liquid a little hydrochloric acid, heat to boiling, and add a few cubic centimeters of solution of chloride of barium. Even after standing for several hours no reaction for sulphuric acid should show itself. [See, however, below, since a product of this degree of purity is only required in analysis.]

Alumina: 10 c.c. of solution of hydrogen peroxide, when diluted with water and treated with ammonia and ammonium carbonate, yield no precipitate.

Phosphoric Acid: On mixing 5 c.c. of hydrogen peroxide solution, previously diluted with water, with a few cubic centimeters of magnesia mixture [solution of 110 gm. of magnesium chloride and 140 gm. of ammonium chloride in 1,300 c.c. of water, addition of water of ammonia, specific gravity 0.960, to 2 liters, and filtering after two days], and with ammonia in excess, nothing material should separate [that is, the solution should not become more than slightly turbid].

Magnesia: On adding to 5 c.c. of hydrogen peroxide solution some ammonia and a few cubic centimeters of sodium phosphate solution, no precipitate should appear.

*Quantitative Determination.*—The following method is very convenient: Titrate with a solution of permanganate which has been standardized by oxalic acid. Or, if no standardized permanganate is at hand, proceed as follows: Make a solution of 3.2 gm. of the purest obtainable permanganate (Merck's "Kalium hypermanganicum purissimum" in 1 liter. Dilute

5 c.c. of hydrogen peroxide solution with 50 c.c. of water, add 10 c.c. of diluted sulphuric acid (1 : 4), and titrate with the permanganate solution until a permanent red tint remains. Each 1 part of permanganate corresponds to 0.538 parts of hydrogen peroxide.

Hydrogen peroxide is frequently [in the United States always] furnished by factories by so-called volume instead of by weight per cent. A 10-volume solution, for instance, is one which contains for every volume of the solution 10 volumes of available oxygen. A 10 per cent. (by volume) peroxide of hydrogen contains 3.0382 parts by weight of $H_2O_2$.

——— *Uses.*—The use of hydrogen peroxide as a useful oxidizing agent in analysis was first proposed by Alex. Classen and O. Bauer (*Berichte*, 16, 1061), particularly for oxidizing and determining sulphur in carbon disulphide, in metallic sulphides, and in sulphites and hyposulphites.

The solution of the peroxide must be examined as to its strength from time to time, since it decomposes, particularly when it is not acid in reaction. Explosions have sometimes been caused by the decomposition of the peroxide. If the pure, unacidified peroxide is kept in glass vessels, the alkaline nature of the glass is, in itself, sufficient to hasten the decomposition of the compound. For this reason it is customary to acidify it.—Am. Drug., July 1891, 217.

——— *Absolutely Pure.*—L. Crismer dissolves barium peroxide in a slight excess of diluted hydrochloric acid (sp. gr. 1.10), and shakes the solution with an equal volume of ether. The ethereal layer is separated and shaken with a little water, which will take up most of the hydrogen peroxide, after the separation of which the ether is again shaken with the above separated solution of barium peroxide, and then with water as before. These operations are repeated five or six times. It is possible in this way to obtain solutions containing 0.8 to 0.9 per cent. of the peroxide, which are perfectly neutral and free from foreign substances.—Chem. Zeitg. (Rep.), 1891, 205, from Bull. Soc. Chim., 1891, 24.

——— *Preparation.*—H. V. Vincent has patented the preparation of hydrogen peroxide from barium peroxide. Barium nitrate is calcined, and the formed peroxide exposed to the action of carbonic acid gas, when hydrogen peroxide is set free and barium carbonate is formed; the carbonate is treated with the nitric acid obtained from the calcination of the nitrate, and the carbonic acid is passed into the gasometer, to be used as before.—Chem.-Zeitg., 1891, 1774.

——— *Test for Minute Quantities.*—T. Fairley detects so small a quantity as 0.24 mgm. of hydrogen peroxide by adding 1 or 2 c.c. of ether to 5 c.c. of the peroxide solution and a small drop of a 10 per cent. solution of chromic acid; and even 0.10 mgm. can be detected by using 1 c.c. of the peroxide solution and 1 c.c. of ether. But by the use of 5 c.c. of a dilute uranium nitrate solution 0.05 to 0.25 mgm. of the peroxide can be

detected; and conversely, as little as 0.5 to 0.25 mgm. of uranium can be detected.—Am. Drug., 1892, 43, from Chem. News.

——— *Test.*—G. Deniges uses metaphenylenediamine chloride which gives a carmine-red coloration; this test will show 0.005 mgm. in a drop of water, but is affected by the presence of nitrites. The following modification renders the test independent of nitrites. One or two drops of metaphenylenediamine chloride is added to 1 c.c. of ammonia, containing a few drops of hydrogen peroxide solution; the mixture is boiled for some minutes when the previously colorless solution becomes blue, the intensity corresponding with the amount of peroxide; addition of soda or potassa solution changes the color to red.—Journ. Chem. Soc., 1891, 1549, from Bull. Soc. Chim., 1891, iii., 293.

——— *Molybdate Test.*—Crismer criticizes the molybdate test (with sulphuric acid) of Denigès (See Proceedings 1890, xxxviii., 512, and xxxix., 475) as not sufficiently sensitive and untrustworthy, and recommends the use of citric acid instead of sulphuric acid. Deniges, however, maintains that his test, provided concentrated sulphuric acid and not merely acidulated water be used, will be found sufficiently delicate. He states that his test is most delicate at 60° to 80° C. In practice a few c.c. of the reagent are heated in a test-tube, and a few drops of the liquid to be tested are added, when immediately a yellow to deep orange color appears. The mixture of ammonium molybdate solution and sulphuric acid turns blue after a time, but the color disappears on heating.—Chem. News, 1892, lxv., 132, from Bull. Soc. Ch., 1892.

——— *Valuation.*—Charles Rice calls attention to the fact that commercial peroxide of hydrogen scarcely contains over three per cent. by weight of absolute peroxide, and that the so-called "10" and "15" volumes seldom come up to their claim. He suggests therefore the valuation of the article by the pharmacist. This is easily done by carefully measuring 10 c.c. of the peroxide into a graduated cylinder and adding sufficient distilled water to make 100 c.c. Of this liquid transfer 10 c.c. to a beaker, add to it 15 c.c. of dilute sulphuric acid, and then, from a burette, decinormal permanganate of potassium (3.16 gm. in the litre), until the color of the permanganate is no longer discharged, the liquid showing a faint pink. Every c.c. of the decinormal permanganate corresponds to 0.0017 gm. of hydrogen peroxide, or to 0.0008 gm. of oxygen gas (only half of the oxygen liberated by the permanganate is derived from the peroxide). In order to convert the weight of the oxygen into c.c., it must be recollected that 1,000 c.c. weigh 1.43 gm., hence 0.0008 gm. of oxygen measure 0.5594 c.c., and consequently the number of c.c. of permanganate multiplied by 0.5594 will give the volume strength of the peroxide. A true 10 volume peroxide, therefore, consumes 17.8 c.c. of the decinormal permanganate. Rice contends that it would be more

rational to express the strength of a peroxide of hydrogen, not by the volumes of oxygen obtainable from one volume of peroxide, but by the number of c.c. of decinormal permanganate (of correct titre) required for its decomposition.—Am. Drug., 1892, 30.

——— *Intensified by Magnesia.*—It was ascertained some time ago that when calcined magnesia is added to peroxide of hydrogen, the bleaching action of the latter upon cotton is greatly intensified.

Prud'homme has recently studied this behavior, and has found that there is produced a peroxide of magnesium which is much more stable than the peroxide of hydrogen, even at a boiling temperature.

If a 6 volume peroxide of hydrogen is diluted with 10 parts of water, and then boiled for half an hour, its strength is reduced in the proportion of 100 to 10.

But if, under the same conditions, there are added 5 gm. of calcined magnesia for every 100 parts of peroxide present, the half-hour's boiling will reduce the strength in $H_2O$ only by one-tenth (from 100 to 90).

The bleaching effect of a mixture of magnesia and peroxide of magnesium is due to both agents acting together. When fatty substances, such as oils, are bleached by these agents at a boiling temperature, there is an abundant escape of carbonic acid gas, due to the oxidation of glycerin.

Peroxide of hydrogen alone, when very slightly acidified, is capable of attacking neutral fats, producing therefrom fatty acids under evolution of carbonic acid gas.—Am. Drug., Aug. 1891, 230; from Compt. Rend., 112, 1374.

[*Note by Ed. Am. Drugg.*—The facts above given may be utilized in surgical practice, in which peroxide of hydrogen is at present playing an important part as an antiseptic and disinfectant. The addition of magnesia will, in many cases, not be objectionable; and when it is desired to have the peroxide act rather slowly and gradually, no better method can be employed.]

——— *Reaction with Potassium Permanganate.*—When a solution of potassium permanganate, acidulated with sulphuric acid, is made to act upon hydrogen peroxide, the reaction is quite sluggish at times. This can be remedied, according to R. Engel, by mixing the peroxide previously with a little manganous sulphate, when the reaction will take place fully and at once, at the first contact. Engel assumes that potassium permanganate, when first encountering the manganous sulphate, oxidizes this to manganic sulphate; the latter salt is then decomposed again to manganous sulphate by the hydrogen peroxide.—Am. Drug., 1891, 284; from Bull. Soc. Chim., vi., 17.

——— Dr. Richardson has written at length upon the medical uses of hydrogen peroxide, stating, among other things, that a "ten volume" solution may be injected either into the cavities or into the cellular tissue without being further diluted. The editor of the Am. Drug. advises, how-

ever, great caution in using it in this manner, even when considerably diluted, very serious results having been produced.—Am. Drug., July 1891, 217.

*Hydrogen Peroxide.*—Antidote to hydrocyanic acid. See *Hydrocyanic Acid.*

NITROGEN.

*Nitrogen—Atomic Weight.*—According to experiments of A. Leduc, the density of nitrogen is 0.9720 (hydrogen, 0.0695), which would make its atomic weight 13.99.—Chem. News, 1891, lxiv., 84, from Comptes rendus, July 1891, cxiii.

——— *Combustibility.*—W. Crookes states that nitrogen is a combustible gas, that is to say, a mixture of nitrogen and oxygen (atmospheric air) will under certain conditions burn with a flame, and production of nitrous and nitric acids. The reason why, when once nitrogen is set on fire, the flame does not spread throughout the whole atmosphere and deluge the world in a sea of nitric acid, is that the igniting point of nitrogen is higher than the temperature produced by its combustion, and therefore the flame is not hot enough to set fire to the adjacent gas.

Crookes showed that on passing an electric current of 65 volts and 15 ampéres, alternating 130 times a second through the primary of a large induction coil, an arching flame, consisting chiefly of burning nitrogen, issued from each of the secondary poles, meeting at the centre. When once started, the poles could be drawn asunder till the flame bridged across 212 mm.—Chem. News, 1892, lxv., 301.

*Nitrogen—Estimation by Kjeldahl's Method.*—L. F. Kebler has arrived at the following conclusions respecting Kjeldahl's method (for which see Proceedings 1885, xxxiii., 212): (1) This method is not as accurate as the absolute method for estimating nitrogen in nitrates, but it is executed much more rapidly, and is applicable for all practical purposes. (2) To avoid loss of nitric acid, the sulphuric acid must be added quickly. (3) The end of the condenser should dip into the liquid in the receiver. (4) The addition of a metallic oxide economizes time. (5) The potassium permanganate must be added to complete oxidation. (6) It is unnecessary to add zinc to the contents of the distillation flask in order to prevent bumping.—Chem. News, 1891, lxiii., 302.

——— *Estimation.*—The official methods of the Association of Official Agricultural Chemists for 1890–91, giving particulars of the "absolute or cupric oxide method;" Kjeldahl's method; and the soda-lime method," will be found in Chem. News, 1892, lxv., 257-260.

——— *Comparison of the Methods in Use for Estimating Organic Nitrogen.*—R. W. Oddy and J. B. Cohen compared the methods of Dumas, Wanklyn and Kjeldahl, using colorless isinglass as a typical albuminoid substance. By Dumas' method they obtained from 15.2 to 15.7 per cent.,

from which it might be presumed that 15.2 is the nearest the truth, his method being known as slightly too high. Wanklyn's process yielded a quantity of ammonia equivalent to 10.5 per cent. of nitrogen, which certainly is too low. Kjeldahl's gave with pure sulphuric acid, 13.5; with commercial acid, 14.1 to 14.25; and with another sample, 15.2 to 15.8. The mean is decidedly too low. The authors think that in Kjeldahl's process, while very satisfactory in the case of the more readily decomposed organic compounds, the results have a tendency to be too low in the case of substances decomposing less easily.—Yearbook Pharm., 1892, 144; Jour. Soc. Chem. Ind., ix., 17.

——— *Estimation of the Total Nitrogen in Manures.*—E. Aubin and J. Quenot make use of the fact that tannin precipitates the albumen contained in the manure, and thus renders the organic nitrogen insoluble. One gm. of the manure is placed on a small filter, and is exhausted with 30 to 40 c.c. of a 2 per cent. tannin solution. The nitrogen in the residue is estimated by Kjeldahl's method, and is the organic nitrogen, whilst the filtrate similarly estimated gives that existing as ammonium salts; the nitrogen present as nitric acid being determined by Schloesing's method. In the case of manures containing ammonium-magnesium phosphate, 1 gm. should be digested with 0.5 gm. tannin in 150 c.c. of carbonic acid water for fifteen hours.—Yearbook Pharm., 1891, 145; from Bull. Soc. Chim., iii., 322–326.

——— *Stereochemistry.*—A. Donner has an interesting article on this subject, which does not admit of an abstract.—Pharm. Zeitg., 1891, 455, 469.

——— *Direct Combination with Alkaline Earthy Metals.*—M. Maquenne has succeeded in combining nitrogen directly with alkaline earthy metals at a cherry-red heat, forming nitrides which are immediately decomposed by water with production of ammonia. He heats a rich amalgam of the metal (15 to 20 per cent.) in an atmosphere of pure nitrogen; the experiment must be made in a boat of iron or nickel, as platinum is rapidly attacked. The temperature is kept at a dull red heat for half an hour, so as to expel the greater part of the mercury. It is then raised for a few instants to a bright redness, and allowed to cool. The nitride appears as a brown mass of a semi-metallic lustre, very easily attacked by moist air.—Chem. News, 1892, 50; from Comptes rendus, 1892, cxiv., 25.

*Azo-compounds.*—Charles Lauth finds that on submitting the azo-compounds to the action of various oxidizing agents in the cold, the azo group is split up, yielding on the one hand a diazo-compound, and on the other, bodies of the quinonic series. Both alkaline and acid oxidizing agents give analogous results, but as the former promote the decomposition of the diazo bodies, they ought to be rejected. He prefers lead binoxide to

sulphuric acid.—Comptes rendus, cxii., 1481, through Chem. News, July 17, 1891, 37.

*Nitrification.*—

*Nitrifying Schizomycetes—Action.*—O. Loew suggests that the oxidation of the ammonia in the soil caused by the nitrifying schizomycete *Nitromonas* is partly complete, as expressed by the equation $2NO_2H_3 + 3O_2 = 2NO_2H + 2H_2O$, partly incomplete, according to the formula $2NH_3 + 2O_2 = 2NO_2H + H_4$, and that the hydrogen thus set free immediately combines with carbon dioxide to produce formic aldehyde, according to the equation $CO_2 + H_4 = CH_2O + H_2O$.—Pharm. Jour. Trans., Dec. 1891, 476.

See also *Bacillus denitrificans*, in "Botany."

*Nitrification.*—R. Warrington has published the fourth part of his paper on nitrification, which, though very interesting, it is impossible to abstract here; we can only give the different headings of the chapters: (1) Distinction between the production of nitrates and nitrites; (2) Isolation of nitrous organism; (3) Properties, form and nutrition of the nitrous organism; (4) Production of nitrates; (5) Theory of nitrification; (6) Summary. It may, however, be briefly stated that Warrington has isolated the micro-organism of nitrous acid. This microbe oxidizes ammonia to nitrous acid, but is without action upon nitrites. In solutions of asparagin, urea, and in milk and urine, it generates nitrous acid. The presence of bicarbonates of calcium or sodium promotes the nitrification, which is hindered by sodium carbonate. The author isolated also the microbe of nitric acid, which energetically transforms nitrites into nitrates, but cannot oxidize ammonia. This microbe develops easily in inorganic solutions containing phosphates, potassium nitrite, etc. The first microbe is easily separated from the second by successive cultures in solution of ammonium carbonate; the second can be separated from the first by successive cultures in solution of potassium nitrite containing monosodium carbonate.—Journ. Chem. Soc., July 1891, 484–529; Chem. Zeitg., 1891, 884.

*Manure.—Value of Animal Debris as a Nitrogenous Dressing.*—A. Muentz and A. C. Girard sum up the results of their investigations as follows: Nitrogenous materials require that their nitrogen be transformed into the state of nitrate before plants can avail themselves of them as an aliment. Hence the aptitude of organic manures to undergo nitrification under the influence of organisms present in the soil may be taken as a measure of their activity as dressings. The authors divide the manures into three classes: (1) Undergoing nitrification rapidly, comprises dried blood, dried flesh, horn refuse, and guano. (2) Burnt leather, woollen waste, and dried night soil, these do not give their whole effect in one season, but have some influence on the following crop. (3) Unburnt leather waste, the nitrification of which is so slow that the yield of the crop is not sensibly augumented.

With manures of the first class, 60 per cent. of the nitrogen has been utilized in two years; of the second class, 40 per cent.; and with those of the third class only 20 per cent.—Jour. Chem. Soc., 1892, lxi., Abstr., 96, from Comptes rendus, 1890, cxii., 1458.

*Nitrification of the Soil.*—Schloesing and Laurent draw the conclusion from their experiments that the soil does not absorb appreciable quantities of nitrogen so long as its surface is free from mosses, algæ, etc.; but that soil covered with this adventitious vegetation absorbed measurable quantities of nitrogen. If this phenomenon is shown to be general, the increase in fertility of fields allowed to lie fallow is explained.—Chem. Drug., Dec. 1891, 834.

*Nitric Acid—Estimation of, in Water.*—M. Rosenfeld makes use of pyrogallic acid (which, by the way, has been recommended by Curtman: see Proceedings 1886, xxxiv., 481—*Reporter*). 3 c.c. of the water are rapidly mixed in a conical test-glass with 6 c.c. of concentrated sulphuric acid, one drop of a 1 per cent. solution of pyrogallol is then added, and cautiously mixed with the upper two-thirds of the liquid. The dark-brown to violet color appears either immediately or after some minutes. As little as 1 mgm. of nitric anhydride per litre can be detected, and up to 15 mgm. comparisons of the depth of color with standards furnish a roughly approximate estimation.—Yearbook Pharm., 1892, 143; from Zeits. analyt. Chem., xxix., 661–664.

——— *Estimation of, in Water.*—G. Loof dissolves 0.2 gm. of sodium salicylate in 5 c.c. of the water to be tested, and adds 10 c.c. of colorless sulphuric acid, so that it may flow slowly down the side of the glass, forming two layers. On mixing the two layers by shaking, the entire liquid takes a color which varies from red to pale yellow, according to the proportion of acid present. 1 part of acid in 100,000 parts of water may be detected in this manner.—Am. Drug., 1892, 11, from Pharm. Centralh.

——— *Estimation by Reduction to Ammonia.*—The reaction by iron and sulphuric acid takes place with quantitative completeness (see Proceedings 1891, xxxix., 480). This estimation, however, according to K. Ulsch, can be very conveniently made by means of the deficit in the hydrogen evolved. The iron for this purpose, which should be in the form of the most finely-powdered wrought-iron filings, as free as possible from oxide, should be coated with copper by warming 3 gm. of it with 20 c.c. of a 10 per cent. solution of copper sulphate, and washing. This quantity suffices for 25 estimations, when working with about 10 mgm. of nitrate. On warming a known quantity of sulphuric acid with an excess of this couple, a constant volume of hydrogen is evolved, and the reaction is rapidly and sharply completed. The presence of 1 mol. of a nitrate ($MNO_3$) causes a deficiency of 10 atoms of hydrogen, or 1.106 c.c. of hydrogen (dry, and at 0° C. and 760 mm.) per mgm. of potassium nitrate.

The author figures and describes the apparatus, which consists of a decomposition flask and a nitrometer. He states, finally, that in the absence of nitrates this method may also be used for acidimetry.—Jour. Chem. Soc., Aug. 1891, 960; from Zeits. anal. Chem., xxx., 175–195.

*Water—Estimation of Nitrates.*—In place of the somewhat cumbersome methods used at present, George Harrow proposes to use Griess' color test for nitrous acid, the nitrates previously having been reduced by zinc dust. The advantages of the process are its rapidity, simplicity and ease of execution, besides the small quantity of water required for analysis, 20 c.c. being sufficient. The only precaution necessary is to avoid the addition of large quantities of zinc dust, which would decolorize the solution.

The test solution used consists of

| | |
|---|---|
| Alpha-naphthylamine | 1 gm. |
| Sulphanilic acid | 1 gm. |
| Ordinary strong hydrochloric acid | 25 c.c. |

dissolved in about 200 c.c. of distilled water, boiled with a small quantity of animal charcoal, filtered, and made up to 500 c.c.

There are also required standard solutions containing

| | | | |
|---|---|---|---|
| 1.0 | part N | as nitrates | Per 100,000. |
| 0.1 | " | " | " " |
| 0.01 | " | " | " " |

To prepare these solutions, 0.721 gm. of pure and dry potassium nitrate is dissolved in 1 liter of water; the resulting solution contains 10 parts of N per 100,000, and may be readily diluted to the strength required. If many water analyses are to be made, it is as well to make up a quart of each of the standards.

A small quantity of zinc dust is also required, contained in a wide-mouthed bottle, into the cork of which a miniature spatula, constructed of brass or platinum foil, should be fixed.

The process is conducted as follows: 50 c.c. of each water to be tested —and as many as four estimations may readily be conducted at the same time—are placed in beakers (100 c.c. contents) side by side on a sheet of white paper, and with them, in three similar beakers, 50 c.c. of each of the standard nitrate solutions; to each beaker are now added 10 c.c. of the test solution, and afterwards a very small quantity of zinc dust (7 to 8 mgm.) by means of the miniature spatula; the quantity added should be approximately the same in each case, and I find that there is no difficulty in effecting this. If nitrates be present in the waters a more or less intense pink color will make its appearance, and this color may be compared with that produced in the three standard nitrate solutions, after the lapse

of fifteen minutes; a rough approximation to the truth is obtained in this first experiment.

To get an accurate result the water must be diluted until the color produced is very nearly like that given by one of the standards; perhaps the greatest accuracy may be obtained with the most dilute standard, and, if it be used, a hundredfold dilution of the water to be tested is frequently advisable; the necessary dilution is, of course, indicated by the first experiment.

The diluted waters are again tested against standards 0.1 or 0.01, and, after fifteen minutes, the colors carefully compared in Nesslerizing cylinders of equal calibre, which may be conveniently graduated at the side. The standard solution occupying 60 c.c. in one cylinder, the water tested is run into the other until the depth of color appears to be equal; a reading is then made of the quantity necessary. Say 45 c.c. were employed: then $45 : 60 :: 0.1 : x$ ($= 0.133$); and supposing the water to have been ten times diluted, it would contain 1.33 parts nitrogen as nitrates and nitrites.—Am. Drug., Aug. 1891, 252, from Jour. Chem. Soc.; Chem. Zeitg., 1891, 656.

*Nitric Acid—Reduction to Ammonia.*—A. Becker states that Vortmann's process for the estimation of nitric acid by electrolysis is based on the formation of a hydrogen alloy.

Vortmann electrolyzes the nitrate in the presence of sulphuric acid and a metallic salt, such as cupric sulphate. During the electrolysis, metallic copper is deposited and hydrogen is evolved, but neither of these is capable of effecting the reduction. As there, however, is no doubt about the reduction, Becker concludes that this is caused by an alloy of copper and hydrogen. In his opinion the reduction would take place instantaneously in the presence of the compound of palladium and hydrogen.—Journ. Chem. Soc., 1892, lxii., Abstract, 403, from Chem. Zeitg., 1891, 1557.

——— *Estimation in Nitrates.*—George McGowan estimates the following method, which, in its principle, is identical with that of L. L. De Koninck and Nihoul, as published in Zeits. f. angew. Chem., Aug. 15, 1890, but in the details is very different. When a fairly concentrated solution of a nitrate is warmed with an excess of pure, strong hydrochloric acid, the nitrate is completely decomposed, and the production of nitrosyl chloride and chlorine is *quantitative*, the reaction, as Tilden has shown (Journ. Chem. Soc., 1874, vol. 27, 630), being $HNO_3 + 3HCl = NOCl + Cl_2 + 2H_2O$. If the operation is conducted in an atmosphere of carbonic acid, and the escaping gases are passed through a solution of iodide of potassium, an amount of iodine is liberated exactly equivalent to the *whole* of the chlorine present (free and combined), nitric oxide escaping. One mol. of nitric acid thus yields 3 atoms of chlorine or iodine. The iodine can then be titrated in the usual manner with sodium thiosulphate. It is, of course, absolutely essential for this process that air should be com-

pletely excluded from the apparatus, as, if any were present, the escaping nitric oxide would be re-oxidized to nitrogen trioxide or tetroxide, and this would in its turn liberate a further quantity of iodine from the iodide solution. (The author gives a sketch and a description of the somewhat complicated apparatus.) In order to test the value of the process, pure nitrate of potassium was used, that is, ordinary nitrate recrystallized in small crystals twice, drained, dried in the air-bath, powdered finely, and again dried at about 160° C. 0.2627 gm. nitrate was taken. The liberated iodine required 38.56 c.c. of thiosulphate solution (of which 1 c.c. 0.006805 gm. $KNO_3$) for conversion. This gave 0.2624 gm. nitrate found, or 99.89 per cent. This process is, of course, only applicable in the absence of organic matter, and reducing agents generally. For further details and precautions, see Journ. Chem. Soc., July 1891, 530–536.

——— *Action upon Iron.*—The acid attacks iron at every degree of concentration, but the action may take place in two different manners, the one rapid and attended with an escape of gas, the other slow and without a production of gas. The so-called "passivity of iron" is not due to the absence of all action, but merely to slow action without the liberation of gas. —H. Gautier and G. Charpy, Comptes rendus, cxii., 25, through Chem. News, July 10, 1891, 23. Chem. Zeitg., July 1891, 133.

*Nitrates—Test in Presence of Chlorates.*—Matthew Forbes gives the following test: Put together in a test-tube potassium nitrate, potassium chlorate, dilute sulphuric acid and an excess of copper foil. Place the test-tube in a beaker, containing a saturated solution of sodium chloride, and heat to boiling. The chlorate, being least stable, is first decomposed, the liberated chlorine attacking the copper and a greenish gas is given off. At a higher temperature the nitrate is decomposed, and attacks the copper with formation of brown fumes.

*Nitrates—Test in Presence of Bromine and Iodine.*—Put into a test-tube the nitrate, the bromide or iodide, lead shavings and strong hydrochloric acid, and heat. The nitrate is decomposed, attacks the lead with formation of nitrate of lead, which is again decomposed by the hydrochloric acid, and will be found as a white precipitate on cooling. The haloid elements will be set free, but do not obscure the white precipitate.—Chem. Drug., Oct. 1891, 516.

*Nitrates—Estimation by the Phenolsulphonic Acid Method.*—G. H. Bartram found that the discrepancies in the results obtained in duplicate estimations of nitrates in water by this method [The process consists essentially of evaporating a measured quantity of water to dryness, and treating the residue with a solution of phenol in sulphuric acid, a portion of which the nitric acid liberated converts into nitrophenols, which, when made alkaline are strongly yellow; the color so obtained is compared with that produced in a similar way from known quantities of potassium

nitrate] were due to the fact that the phenolsulphonic acid shortly after preparation becomes susceptible to the action of chlorine, when the quantity is as much as, or more than four times, that of the nitric nitrogen, and that the results may in this way show a deficit of 20 or even 40 per cent. of the total amount of nitric nitrogen actually present. This can be obviated by either removing the chlorides or by using freshly prepared phenolsulphonic acid.—Jour. Chem. Soc., Sept. 1891, 1136, from Chem. News, lxiii, 228.

*Nitrates, Detection in Wines*—See *Wines.—Vitaceæ.*

*Nitrous Acid.*

*Nitrous Acid as Disinfectant.*—This acid has been proposed because of its peculiarity of being a reducing as well as an oxidizing agent. H. Borntraeger employs the following combination containing 20 per cent. of sodium nitrite: One part of sodium nitrite and 1 part of gypsum are melted together; after cooling, the mass is powdered, and kept in well-stoppered containers. Two parts of sodium bisulphate and one part of gypsum are also melted together, and powdered. Both powders are mixed, and kept from moisture. If this powder be thrown into water or substances to be disinfected, a uniform evolution of acid takes place which rapidly destroys foul odors.—Am. Jour. Pharm., 1892, 190, from Pharm. Centralh., 1892, 117.

——— *Estimation of Nitrous Acid in Water.*—According to M. Rosenfeld a solution is made, containing 0.5 gm. of pyrogallic acid, 90 c.c. of water, and 10 c.c. of sulphuric acid. Of this mixture 2 c.c. are added to 100 c.c. of the water in the cylinder jar. 0.04 mgm. of nitrous anhydride in the 100 c.c. produces a yellow color immediately; with 0.01 mgm. the color develops only in the course of about seven hours. Up to 0.05 mgm. a difference of 0.005 mgm. is perceptible.—Yearbook Pharm., 1892, 143, from Zeits. Analyt. Chem., xxix., 661–664.

——— *Detection in Water.*—A. D. Tchirikow calls attention to the fact that the success of the iodine-starch reaction depends on the temperature; in the cold it will always succeed, while at a temperature higher than 10° C., the blue color will be noticed comparatively seldom. He questions whether the other nitrous tests are independent of the temperature. —Pharm. Zeitg., 1892, 71, from Ph. Zeit. Russl.

*Water—Test for Nitrites.*—F. Musset states that in testing for nitrous acid by means of zinc iodide and starch solution with acetic acid, the color produced becomes continually darker and darker. This change is due to the reducing action of bacteria upon the nitrates present.—Chem. News, 1891, lxiv., 225, from Pharm. Centralh.

*Nitrites in Water—Griess' Reaction and Temperature.*—G. Bosio states that the temperature, at which Griess' test for nitrites (aniline-sul-

phuric acid and naphthylamine sulphate, red color) is carried out, has considerable influence on the time required for the appearance of the coloration, and on the depth of the tint. At a temperature of 0° to 10° C. the product is insoluble, and separates as a reddish-white, gelatinous precipitate, which, on raising the temperature to 40–50° C., redissolves instantly, giving the characteristic crimson coloration. It is therefore advisable to uniformly heat the water to the boiling point, or to 50–60° C., after adding the reagents.—Journ. Chem. Soc., 1892, lxi., 657, from l'Orosi, xiv., 416–418.

*Alkaline Nitrites.*—G. A. LeRoy causes 1 mol. of barium sulphide to react upon 4 mols. of nitrate of sodium, obtaining thus the soluble nitrite and the insoluble barium sulphate. He mixes the two substances finely powdered, projects them by small portions into a cast-iron bowl previously heated to dull redness and stirs the fused mass continually. The mass is taken up in water, the liquid decanted, filtered and concentrated to 35°–45° B. The barium sulphide must be free from carbon.—Moniteur Quesneville, 1891, No. 584, through Chem. News, July 17, 1891, 38.

*Nitrates and Nitrites*, see the respective Bases.

*Nitrosyl Chloride—Action on Metals.*—J. J. Sudbury has studied the action of nitrosyl chloride on the following metals: Magnesium, zinc, cadmium, lead, thallium, copper, silver, mercury, aluminium, iron, manganese, nickel, tin, antimony, bismuth, arsenic, gold and platinum. The results which he arrived at are:

Zn, Hg, Al, Fe, Sn, Sb, Bi and As are readily attacked, even in the cold. Mg is not acted upon at all; Cd, Pb, Tl, Cu, Au and Pt only when heated with the nitrous chloride at 100° C. for several days. Mn, Ni and Ag only slightly. Zn, Tl, Cu, Fe, Sn, Sb, Bi, Au and Pt are the only metals, the nitrosochlorides of which are capable of existing at ordinary temperatures; all of these, however, are very deliquescent, and are decomposed by water.—Jour. Chem. Soc., Aug., Sept. 1891, 655–664.

*Nitric Oxide—Preparation.*—F. Emich prepares pure nitric oxide by filling a suitable flask (Erlenmeyer) to within a few c.c. of its top with sulphuric acid, which need not necessarily be pure, and adding about two per cent. of sodium nitrite. Through a long-necked funnel sufficient mercury is poured in to barely cover the flat bottom of the flask, and the evolution of nitric oxide will go on uniformly for several hours (according to the quantity operated with). The oxide will probably contain traces of anhydrous nitrous acid, which can be removed by passing the gas through potassa.—Chem. Zeitg., Rep., 1892, 149: from Monatshefte.

*Azoimide—Hydrogen Nitride.*—This acid is obtained by a series of organic reactions, which may be summarized as follows:

By the action of hydrazine hydride on an alcoholic solution of ethyl hippurate, hippurylhydrazine, $NHBz.CH_2.CO.NH.NH_2$, is formed, which,

by the action of nitrous acid, is converted into nitrosohydrazine hippuric acid, NO.NH.N : CPh.NH.$CH_2$.COOH. The latter body splits up into hippuric acid and azoimide by treatment with soda solution. On boiling the solution of the sodium compound of azoimide with dilute sulphuric acid, the azoimide distils over with the steam, and is converted into the silver salt by precipitating with silver nitrate, which salt is then decomposed with dilute sulphuric acid. By repeating this process, finally a solution is obtained which contains 27 per cent. of the gas. T. Curtius and R. Radenhausen concentrate this solution by repeated fractional distillation, until a product is obtained which distils at 45° C., when it contains 91 per cent. of the anhydrous compound. and can be completely dehydrated by means of fused calcium chloride. At a low temperature azoimide is a clear, colorless liquid, having a strong pungent odor, and boiling at 37° C. It is soluble in water and alcohol.—Yearbook of Pharm., 1891, 19, 20; from Ber., xxiii., 3023–3033, and Jr. prakt. Chem., xliii., 207.

*Azoimide—(Nitrohydric Acid).*—Th. Curtius continues his researches on azoimide and its salts. (See Proceedings, 1891, xxxix., 476.) The most interesting substance obtained is "diazohippuramide," $C_6H_5$CON-H$CH_2$COHN—N=N—OH, which combines with the representatives of nearly all classes of bodies, organic and inorganic, partly in the cold and in two very different manners: (1) Either nitrohydrogen is split off (action of alkalies, ammonia, aniline, toluylendiamine, diamide, phenylhydrazine; (2) Or there escapes nitrogen (action of water, alcohol, halogenous alkyles, aldehydes, halogens, acidyl hydrazines).—Chem. News, 1891, lxiv.; 1892, lxv., 5, 21, 300, 314; from Ber., 1891, xxiv., 3341–3349.

*Azoimide, Behavior with Living Organisms.*—O. Loew has undertaken to answer the following three questions: (1) Can the salts of this acid, like the nitrates and nitrites, serve as a source of nitrogen for the nutriment of vegetable cells? (2) If not, are these salts indifferent or poisonous? (3) If poisonous, wherefore? He comes to the conclusion that the salts of azoimide are intensely poisonous to all organisms, phanerogams, schizomycetes, hyphomycetes, infusoria, aquatic animals (from nematodes to water-beetles and leeches), and mammalia. Algae are affected very slowly, and saccharomycetes are a good deal more resistant than schizomycetes and hyphomycetes. According to Loew, the probable cause of the intense toxic action is as follows: Azoimide and its compounds are easily decomposed and with a violent explosion. As the vital activity of the cells sets up decomposition by the transfer of violent atomic vibrations, the sudden decomposition of the azoimide compounds may react upon the protoplasm, and occasion a rearrangement of the active proteine matter. According to the nature of the cells will be the manifestations; for instance, if the cells are ganglionic, it will appear as irritation, and the destructive process, introduced by rapidly succeeding irritations, can bring the entire system into decomposition.—Chem. News, 1891, 276, 288, 300, from Ber., 1891, xxiv.

## SULPHUR.

*Sulphur as Indicator.* See under *Acidimetry.*

*Sulphur—Estimation.*—F. P. Treadwell communicates a simple method for estimating sulphur in insoluble sulphides. This is done by heating the sulphide with an excess of iron to dull redness in an atmosphere of dry carbonic anhydride for five to ten minutes, and after cooling decompose the sulphide of iron with dilute hydrochloric acid (1 : 5). The hydrogen sulphide is absorbed in a Fresenius-Vollhard apparatus, the first bottle of which contains a mixture of 50 c.c. of pure hydrogen peroxide (2 per cent.) and 10 c.c. of semi-normal ammonia, and the second bottle 10 c.c. of semi-normal ammonia. After absorption the contents are boiled with a little hydrochloric acid for half an hour, and then evaporated to dryness; the final estimation is made with barium chloride. In view of the sulphur, which is generally present in iron, it is advisable to make a blank experiment first.—Journ. Chem. Soc., Sept. 1891, 1137; from Ber., xxiv., 1937; Chem. Zeitg. (Rep.), July 1891, 193.

*Sulphur—Detection in Illuminating Gas.*—In order to detect sulphur in illuminating gas when not combined with hydrogen, L. Ilosvay recommends to pass the gas through a glass tube containing asbestos, which is maintained at a dull-red heat. After being washed by passing through a little water, the gas is filtered through wadding and then traverses a tube containing lead-paper, which is blackened by the hydrogen sulphide formed when the sulphur compounds contained in the gas are heated.—Journ. Chem. Soc., July 1891, 862; from Bull. Soc. Chim. (3), iv., 714.

*Sulphur—Affinity of the Heavy Metals.*—In 1837 Anthon drew up a table of the metals in the order of their decreasing affinity for sulphur. This table E. Schürmann has enlarged as follows, the metals with the weakest affinity last: Palladium, mercury, silver, copper, bismuth, cadmium, antimony, tin, lead, zinc, nickel, cobalt, iron, arsenic, thallium, manganese. Insoluble sulphides will precipitate (in great part at least) saline solutions of the preceding metals in the list.—Wissen. Wochenschrift, through Chem. News, July 3, 1891, 12.

*Sulphur—Solubility in Alcohol.*—C. Schierholz has investigated the solubility of sulphur in alcohol at different temperatures, and found that at 80° C. 1 part of sulphur is soluble in 265 parts of pure (absolute? Rep.) alcohol and at 17.5° C. in 3300 parts of alcohol.—Pharm. Post, 1892, 573.

*Sulphur—Impressions from Prints.*—Charles Lepierre accidentally found that sulphur melted at about 115° C. will receive very sharp impressions from drawings with lead pencils, colored crayons, writing ink, printing ink, etc.—Am. Drug., 1891, 290.

*Sulphur and Carbon Bisulphide.*—According to Berthelot, there exist two modifications of sulphur, one is easily soluble in carbon bisulphide and

the other rather slowly soluble, but is converted into the easily soluble form by treating it with boiling alcohol. Precipitated sulphur consists solely of the first modification, and sublimed sulphur contains both modifications.—Pharm. Post, 1892, 574.

*"Black Sulphur" of Magnus—Preparation.*—According to F. Knapp, the black sulphur is best obtained by dissolving almond oil in ether (5 to 10 drops =0.2–0.4 gm.), and mix the solution with 50 gm. of flowers of sulphur in a mortar, evaporating the ether. A portion of the mixture is dropped on to the bottom of a red-hot platinum crucible, when almost immediately the bulk of the mixture disappears and a loose, black residue is left; the crucible is at once cooled on an iron plate, and the residue emptied out. The crucible is again heated, and the process repeated. The yield is about 0.685 gm. from 100 gm. of sulphur and 10 drops of oil. The author states that the sulphur exists in two different conditions; one as an integral constituent of the process of carbonization, the other in the free state. The free sulphur differs entirely in its behavior from the ordinary yellow kind. It evaporates at a temperature much higher than the boiling point of the ordinary sulphur; its vapor is not brown but colorless, and when heated with access of air it yields sulphurous acid before the appearance of a visible red heat, and without any phenomena of combustion. When rubbed with kaolin, a light blue color is developed, and this peculiarity connects black sulphur with many other well-known phenomena, as, for instance, the blue color of ultramarine.—Jour. Chem. Soc., Aug. 1891, 877.

### *Sulphuric Acid.*

*Sulphuric Acid--Standardizing.*—M. Weinig states that the following method for standardizing volumetric sulphuric acid is very reliable and simpler than the usual baryta method. This method is based on the fact that ammonium sulphate crystallizes in an anhydrous condition, and can be dried at 115° to 120° C. without loss.

A certain measured quantity of sulphuric acid, approximately diluted to near the strength required, is transferred to a tared platinum capsule. To this is added a quantity of ammonia in a slight excess. The excess must not be too large, otherwise the liquid is apt to spatter. The solution is then evaporated on a water-bath, dried for half an hour at 115° to 120° C., the capsule cooled in a desiccator, and weighed.

For calculating the amount of absolute sulphuric acid, ammonia or of nitrogen corresponding to the quantity of ammonium sulphate found, the following factors are used: For $H_2SO_4$ multiply with 0.74196; for $2NH_3$, with 0.25804; for $N_2$, with 0.21253.—Am. Drug., 1892, 136, from Zeits. analyt. Chem.

——— According to Charles Rice, the right degree of supersaturation of sulphuric acid may be rapidly found by introducing into the platinum

capsule exactly 50 c.c. of the approximately diluted acid, adding to it a few drops of methyl orange solution (1 : 1000), and then sufficient ammonia until, after stirring, the rose-red has changed to yellow, which will indicate a slight excess of ammonia.

——— Charles Rice also calls attention to the fact that ammonium sulphate cannot stand much heating, and that it is therefore best to dry it first at 100° C. for one-half to one hour, and then at 105° C. for fifteen minutes.—Am. Drug., 1892, 169.

*Sulphuric Acid—Estimation in Soluble Sulphates.*—E. Stolle has simplified the method of Wildenstein-Precht, which is based on the fact that ammonia precipitates from a solution of barium chromate in hydrochloric acid, the whole quantity of chromic acid as neutral barium chromate. If, therefore, to a solution of a sulphate is added a hydrochloric acid solution of barium chromate, the total quantity of sulphuric acid is precipitated as barium sulphate. On neutralizing with ammonia, there will be precipitated only the excess of barium chromate, while the chromic acid remaining in solution will be proportionate to the sulphuric acid. Practically the procedure is as follows:

A definite quantity of the sulphate is dissolved (in either water or hydrochloric acid) and a sufficient quantity of the barium chromate solution is added to precipitate all of the sulphuric acid; a large excess is, however, to be avoided. The mixture is rendered alkaline with ammonia, water added to a definite volume, and after filtration an aliquot part of the filtrate is acidulated with sulphuric acid, and the chromic acid titrated with solution of a ferrous salt, using potassium ferricyanide as an indicator. The solution of barium chromate is prepared by precipitating a hot solution of barium chloride with a slight excess of potassium chromate solution, removing the excess with a few drops of barium chloride solution. After washing the precipitate several times with hot water, it is dissolved in hydrochloric acid, and the acid solution reduced to a specific gravity of 1.06.—Pharm. Post, 1892, 609, from Zeits. angew. Chemie, 1892, 334.

*Sulphuric Acid—Densities of Solutions.*—S. U. Pickering defends the accuracy of his determinations against the doubts of Lunge; stating that his determinations were based on the fact that the pure acid must have a higher freezing-point than an acid with excess of either water or anhydride, which method is more reliable than any analysis.—Chem. News, 1891, lxiv, 311.

——— *Contraction on Mixing the Acid with Water.*—Pickering, in continuation of his former researches, has reached the conclusion that the point of maximum contraction per unit weight shifts with the temperature, but the point of maximum contraction per unit volume (of solution formed) is practically unaltered by temperature. This refers to a range of temperature from 8° to 38° C.—Chem. News, 1892, lxv, 14.

*Sulphuric Acid—Dehydration.*—The small quantity of water that cannot be eliminated from the acid by rectification is said to be removable by electrolysis, being decomposed into oxygen and hydrogen before the acid itself suffers change. In order to avoid the decomposition that might occur, M. Leon has recently patented a process in which platinum electrodes of large area, kept cool by the circulation of water through them, are used. The bath itself is also cooled.—Chem. and Drug., Aug. 1, 1891, 191.

——— *Action of Metals.*—A. Ditte has investigated the action of metals on sulphuric acid, and finds that the metals can be divided in two groups:

One contains those metals which are acted on only when the acid is concentrated and hot; the reaction is very regular in all cases, and sulphurous anhydride alone is evolved, no secondary reaction taking place. To this class belong silver, mercury, copper, lead and bismuth.

The second group embraces those metals which are acted upon more or less readily by sulphuric acid of all degrees of concentration. The most constant product of the reaction is hydrogen, this gas always being evolved in the cold, and almost always at a high temperature also. Sulphurous anhydride is only produced when the acid is hot and concentrated; the temperature at which the evolution of sulphurous anhydride commences varies with the metal employed, and, generally speaking, its quantity increases in proportion to the rise of temperature, the quantity of hydrogen decreasing to a proportionate extent, and sometimes, when the temperature is very high, disappearing altogether; when a certain degree of dilution of the acid is reached, sulphurous anhydride ceases to be formed. By choosing a suitable temperature and an acid of suitable strength, it would be possible to obtain a mixture of hydrogen and sulphurous anhydride in any required proportions. To this group belong: Magnesium, manganese, nickel, cobalt, iron, zinc, cadmium, aluminium, tin, thallium, and probably also the alkali metals.—Yearbook, 1891, 25, from Ann. Chem. Phys., xix., 68–92.

——— *Volatile at Ordinary Temperatures.*—G. A. Koenigshas noticed that skeleton crystals of metallic iron, placed on a watch-glass, supported on an iron triangle, in an ordinary desiccator containing sulphuric acid, had after nine months become coated with a white crust of anhydrous ferrous sulphate, and regards this as an indication of the volatility of sulphuric acid at ordinary temperature.—Journ. Chem. Soc., Sept. 1891, 977, from Chem. News, lxiii., 151.

*Fuming Sulphuric Acid—By Electrolysis.*—According to the Revue Scientifique, "Nordhausen" sulphuric acid can be produced by submitting ordinary concentrated sulphuric acid to the action of an electric current, the electrodes being either of platinum or charcoal, and kept at a

distance of two or three mm. apart by means of plugs of asbestos. The force of the current is set down as 0.1 ampere for every c.c. of electrode.—Drug. Circ., 1892, 34.

*Sulphates.*

*Anhydrous Crystallized Sulphates—In the Dry Way.*—P. Klobb prepares these in the dry way by dissolving a little of the respective sulphates in fused ammonium sulphate, and heating gently to slowly volatilize the ammonium salt, when the sides of the crucible will be found studded with minute crystals. He prepared in this way $CoSO_4$, an amaranthine crystalline powder, quite permanent in the air, and very slowly soluble in boiling water. $ZnSO_4$ may be obtained in octahedrals of 2.5 mm. in length; it is colorless, and slowly soluble in cold water, rapidly in hot water. $CuSO_4$ is a light-gray powder, consisting of small prismatic needles, turning gradually green then light-blue, and easily soluble in water with a blue color. $NiSO_4$ is a yellowish-green crystalline powder, insoluble in cold water, and only slowly and with difficulty in boiling water. The author remarks that it is immaterial whether the crystallized or dried sulphates are started from.—Chem. Zeitg., Rep., 1892, 149; from Comptes rendus, 1892, cxiv., 836.

*Alkaline Sulphates—Reduction by Carbon.*—When alkaline sulphates are heated to bright redness in a current of carbonic oxide, they are completely reduced to sulphides, the carbonic oxide being converted into carbonic anhydride. The same reduction takes place on heating a mixture of dry alkaline sulphate with pure carbon in the presence of air, though in this case the carbonic anhydride evolved may be partly reduced to carbonic oxide. In the complete absence of oxygen or air little or no reduction takes place. Berthelot shows that the presence of a small quantity of carbonic oxide at the outset is essential to this reduction, and this is furnished by the oxygen of the air in the vessel, the oxygen in the carbon, or the oxides present in the material of the vessel. As soon as the reduction has commenced, the supply of carbonic oxide is kept up by the reducing action of the carbon on the carbonic anhydride evolved.—Yearbook Phar., 1891, 21; from Comptes rendus., cx., 1106–1112.

*Sulphurous Acid.*

*Sulphurous Acid—Disinfectant Value.*—According to an article in Am. Drug., 1891, 262, it has been found that sulphurous acid diffuses through caoutchouc very rapidly, which would suggest that this acid is the most efficient disinfectant for articles composed of or wrapped in India rubber.

*Sulphurous Acid.*—Clinton E. Main found the strength of twenty-seven samples to vary from 0.001 to 4.02 per cent., the requirements being 3.5 per cent.—Am. Jour. Pharm., 1892, 183.

*Dithionic Acid—Formation.*—A. Holst and R. Otto confirm the observation of Malschevski and Sokoloff that by the gradual addition of a dilute

solution of iodine in iodide of potassium to a dilute solution of hydrogen sodium sulphite, dithionic acid is formed to the extent of 20 per cent. of that theoretically possible. To estimate the amount of dithionic acid in its salts, it is only necessary to heat an aqueous solution with hydrochloric acid until all sulphurous anhydride is expelled, and then to precipitate the sulphuric acid in the residue with barium chloride.—Jour. Chem. Soc., Sept. 1891, 978: from Archiv Pharm., ccxxix., 171–177.

*Hydrogen Sulphide.*

*Hydrogen Sulphide—Reaction.*—On adding a freshly prepared solution of paradiazobenzolsulphonic acid to a liquid containing hydrogen sulphide or an alkaline sulphide, rendered alkaline by the addition of potassa, the liquid will be colored yellow to reddish-brown, according to the amount of sulphide present.—L. van Itallie, Apoth.-Zeitg., 1891, 366.

——— *Freed from Arsenic.*—Oscar Jacobson states that since arsenic hydride and iodine decompose each other to arsenic iodide and hydriodic acid, and hydrogen sulphide has no action upon iodine, either solid or dissolved in strong hydriodic acid, sulphuretted hydrogen can be obtained absolutely free from arsenic by passing it over solid iodine.—Chem. News, 1891, lxiv., 102; from Zeits. analyt. Chem., xxix., 1891.

*Metallic Hydrosulphides.*—S. E. Linder and Harold Picton were led by the observation that freshly precipitated and well-washed antimony sulphide readily blackened bright copper, to investigate the composition of freshly precipitated sulphides. As the results of their experiments they give the following deductions:

(1) The ordinary sulphide precipitates in most cases contain combined sulphuretted hydrogen. (2) Of the metals precipitable by sulphuretted hydrogen, almost all are capable of forming hydrosulphides. (3) These hydrosulphides are in some cases definite compounds of considerable stability, though of high molecular weight. (4) The action of acids seems, as a rule, to be to cause these hydrosulphides to lose part of their sulphuretted hydrogen, and thus to produce compounds of higher and higher molecular weight. (5) That by dissolving the precipitated sulphides in sulphuretted hydrogen water, or other means, solutions of these hydrosulphides may be obtained, which sometimes exhibit no tendency to deposit a precipitate even after months of keeping. (6) These experiments tend also to support the conclusions that the sulphides themselves are in most cases polymerides of a very high molecular weight. (7) Bismuth appears to be incapable of forming a hydrosulphide.—Journ. Chem. Soc., 1892, lxi. (Trans.), 114–136.

*Alcohol—Compound with Sodium Disulphide.*—L. Dumont has obtained the compound in question of the composition $C_4H_6O_2 + 9(NaS_2)$. If placed in a dry desiccator, at the ordinary pressure, it is converted into

a mixture of sodium thiosulphate, sulphite, and a little sulphur.—Chem. News, July 31, 1891, 61, from Bull. Soc. Chimique, v., No. 10.

*Sulphides—Solutions.*—Harold Picton was led by his investigations of the hydrosulphides (which see) to examine into the nature of the "solutions" of the sulphides in sulphuretted hydrogen. There were three methods employed: (1) The metallic solution is allowed to run into sulphuretted hydrogen water kept saturated by a stream of the gas. It may then be freed from uncombined sulphuretted hydrogen by a current of hydrogen, or dialyzed to free it from salts. (2) The metallic hydrates are suspended in water, and treated with sulphuretted hydrogen. (3) The metallic sulphides, in a freshly precipitated state, are suspended in water and treated with sulphuretted hydrogen. By the first method we may obtain the solution of any metallic sulphide, provided no great excess of acid be present. The second method is not always applicable, but has been used in the case of copper and zinc. The third method is applicable to mercury and copper. As to the strength of these solutions, Picton obtained one containing 5 gm. of arsenic sulphide in the litre, and one containing about 10 gm. of mercuric sulphide. He now instituted a series of experiments to determine whether these were actual solutions or merely containing the solid in a very fine state of suspension. When fairly dilute and free from salts, some of the sulphides showed no symptoms of settling, even after several months. The general conclusions he arrived at were the following: With solutions of mercuric, arsenic and antimonic sulphides the fact has been established that they are composed entirely of very minute, solid particles, or of very large molecular aggregates. In all cases the particles are large enough to give results with Tyndall's experiment with a beam of light (scattering it), so that it is completely polarized. They are, however, small enough in some cases to simulate the phenomena of liquid diffusion (in the absence of any membrane). At one end of the series we have pseudo-solutions, resolvable under a high power of the microscope into crowds of minute suspended particles in rapid Brownian movement; at the other end, we have solutions which diffuse more or less after the fashion of true solutions, but which scatter a beam of light, thus revealing the presence of not too minute particles. Picton remarks that it will be easy to conceive of a subdivision so fine that even Tyndall's experiment will no longer discover the particles, and he thinks that there is no satisfactory reason for imagining the existence of any sharp boundary between solution and pseudo-solution, which very likely merge by imperceptible gradations into each other.—Jour. Chem. Soc., 1892 (Trans.), 137–147.

*Sulphates; Sulphites:* See the respective bases.

*Calx Sulphurata—Strength of Commercial.*—According to T. A. Ellwood, four samples of the commercial salt contained respectively; 29.8,

37.6, 42.8 and 46.3 p. c of calcium sulphide.—Pharm. Journ. Trans., Nov. 1891, 393.

*Calx Sulphurata—Commercial.*—The pharmacopœial requirements are not less than 36 per cent. of calcium sulphide. W. G. Kleinstueber examined six samples according to the test of the Pharmacopœia (with sulphate of copper) determining the amount of cupric sulphide formed, and precipitating the copper in the filtrate by potassa, igniting, and weighing it as CuO.

| | Found. | | CaS |
|---|---|---|---|
| Color of Specimens. | CuO | CuS | Per ct. |
| Grayish white | —— | 0.441 gm. | 26 |
| Grayish pink | 0.146 gm. | 0.302 " | 22.76 |
| Grayish | 0.162 " | 0.283 " | 21.31 |
| Gray | 0.300 " | 0.145 " | 8.84 |
| Greenish gray | 0.320 " | 0.093 " | 6.98 |
| Grayish pink | 0.324 " | 0.088 " | 6.63 |

—Am. Journ. Pharm., 1892, 186.

*Potassa Sulphurata—Commercial.*—The Pharmacopœia requires at least 56 per cent. of sulphide. W. G. Kleinstueber examined five samples, following the pharmacopœial test with cupric sulphate. He determined the amount of cupric sulphide formed, and estimated the copper in the filtrate as CuO.

| | Found. | | Potassium. |
|---|---|---|---|
| Color of Specimens. | CuO | CuS | sulphide. |
| Chocolate-brown | 0.02 gm. | 1.541 gm. | 55.10 per cent. |
| Orange-green | 0.272 " | 1.230 " | 44.39 " |
| Green, externally | 0.292 " | 1.214 " | 43.44 " |
| Brown, internally | 0.350 " | 1.141 " | 40 95 " |
| Greenish yellow | 0.460 " | 1.012 " | 36.21 " |
| | 0.520 " | 0.945 " | 33.63 " |

—Am. Journ. Pharm., 1892, 186.

*Sodium Sulphide—Preparation.*—When metallic sodium and sulphur are triturated together they combine with explosion, burning pieces of both elements being scattered about. The combination may be brought about more quietly by triturating 1 gm. of metallic sodium and 3 gm. of common salt to a very fine powder, and then mixing this with 0.7 gm. of flowers of sulphur intimately, but without the least pressure. At the moment when the substances are intimately mixed the sodium and sulphur combine, under fire, the products being the yellow polysulphuret and the flesh-colored sodium monosulphuret.—Am. Drug., Aug. 25, 1891, 251; from Ber., xxiv., 1658.

### SELENIUM.

See under *Silicium.*

### CHLORINE.

*Preparation by Electrolysis from Sodium Chloride.*—See under *Soda.*

*Chlorine—Rapid Generation.*—O. Stueber has patented a mixture for the convenient generation of chlorine. This consists of chlorinated lime mixed with sufficient bisulphate of potassium or sodium to liberate all the chlorine. It needs merely the addition of water.—Am. Drug., 1891, 316.

*Chlorine—Direct Estimation in Mixtures of Alkaline Chlorides and Iodides.*—F. A. Gooch and F. W. Mar suggest the following method: Ten c.c. of sulphuric acid (1 to 1), 2 gm. of ferric sulphate (either as iron-alum or ferrous sulphate oxidized in concentrated solution by about 0.3 c.c. of nitric acid) and 3 c.c. of nitric acid, are added to the solution of the alkaline iodide and chloride, the whole diluted to 400 c.c., and boiled until steam ceases to color red litmus paper greyish blue (found by the authors to be a delicate test for iodine); the chlorine is then determined in the residue.—Yearbook Pharm., 1891, 146, from Am. Jour. Sc., xxxix, 293–302.

*Chlorine—Recognition in Presence of Iodine and Bromine.*—Matthew Forbes found that by slightly heating a mixture of potassium iodide, potassium bromide, sodium chloride and manganese dioxide with acetic acid, iodine is first liberated; after driving it all off, adding a little nitric acid, and heating, bromine is obtained; after driving off the bromine, cooling the tube, and cautiously adding sulphuric acid, chlorine is evolved on heating.—Chem. News, 1891, lxiv, 112. (In 1883 Francis Jones communicated a similar method. See Proceedings, xxxii, 215; from Chem. News.—*Reporter.*)

*Chlorides, Bromides and Iodides, Distinction.*—According to G. Denigès, these three salts may be recognized in a solution by strongly acidifying with sulphuric acid and heating with ferric chloride, when the liberated iodine may be recognized by starch paper. After the iodine has been expelled by boiling, potassium chromate (bichromate? Rep.) is added in order to liberate the bromine, which is recognized by introducing a rod moistened with solution of sodium hydrate into the water, and then dipping it into aniline water, when the hypobromite formed will produce an orange-yellow coloration. After removing every trace of iodine and bromine by continuous boiling of any acid liquid with excess of potassium chromate (bichromate? Rep.), potassium permanganate is added in order to liberate the chlorine, which is recognized similarly with aniline water, the coloration being violet.—Year book, 1891, 145; from Bull. Soc. Chim., iv., 481–483.

*Chlorine—Action upon Metals.*—U. Kreusler confirms the observation

made by Cowper in 1883, that dry chlorine does not act on metals. If, in the well-known experiment of burning a spiral of thin brass wire tipped with Dutch metal in chlorine gas, the latter be dried (simply by passing the gas through a single flask of sulphuric acid), no combustion takes place, but that the addition of a little moisture brings about an immediate combination.—Jour. Chem. Soc., 1892, lxii., 401 ; from Ber., 1891, xxiv., 3947.

*Chlorine Water in Typhoid Fever.*—Burney Yeo strongly recommends a mixture of chlorine water and quinine. Into a 12-ounce bottle put 30 grains of potassium chlorate, drop on it 40 minims of hydrochloric acid, cork the bottle, allow it to stand until all the gas is generated, and pour on water, in small portions, to nearly fill the bottle; finally, add 24 to 36 grains of quinine sulphate and one ounce of syrup of orange peel.—Am. Drug., 1891, 363.

*Chlorates—Iodometric Estimation of Chloric Acid.*—G. McGowan applies the iodometric method, which he has recommended for the estimation of nitric acid in nitrates (see under Nitric acid), to the estimation of chloric acid in chlorates. The chlorate is subjected to the action of hydrochloric acid in a current of carbonic acid, and the chlorine passed into a solution of iodide of potassium, the iodine liberated being titrated with sodium hyposulphite. For details reference must be had to the original paper. In order not to lose any chlorine, no india-rubber should be exposed to the chlorine.—Jour. Chem. Soc., 1892, lxi. (Trans.), 87–89.

*Chlorides, Chlorates.*—See under the respective bases.

*Hydrochloric Acid.*—A. B. Petrie, Jr., found the strength of 25 samples of hydrochloric acid to vary from 20.9 to 37.8 per cent., the requirements being 31.9 per cent.—Am. Jour. Pharm., 1892, 184.

*Hydrochloric Acid—Arsenic.*—Buchner states that he has met with a crude hydrochloric acid containing not less than the astounding amount of 592 gm. of arsenious acid in 100 kilos! Buchner's statement has been confirmed by other parties.—Pharm. Zeitg., 1892, 17, from Chem.-Zeitg., 1891, 13.

*Hydrochloric Acid—Test for Free Chlorine.*—Kupferschlaeger recommends to allow the acid to act upon metallic copper for some time, then to neutralize it (nearly), and test for copper with potassium ferrocyanide. This test is based on the fact that hydrochloric acid, free from chlorine, does not dissolve copper, unless heated to about 200° C.—Zeits. analyt. Chem., 1892, 201 ; from Bull. Soc. Chim., ii., 134.

*Hydrochloric Acid—New Table.*—Prof. Lunge and Marchlewski, who have already reinvestigated the densities and percentages of sulphuric and nitric acids, have now also completed their experiments on hydrochloric acid, and published the results. In view of the importance of the subject for experiments at present conducted in connection with pharmacopœial

revision, we will extract from Lunge's new table those values which most nearly correspond to the specific gravities quoted on page 422 of the U. S. Pharmacopœia.

The figures refer to a pure acid at the temperature of 15° C., compared with water at 4° C., and to a vacuum. The values corresponding to ordinary barometric pressure can be easily calculated. Indeed, the experiments themselves were made at various temperatures and pressures, and the results represented by Lunge's table are the figures obtained by calculation for a temperature of 4° C. and a pressure of 0 mm.

| Spec. Grav. at 15° C. Water at 4° C. | Per Cent. HCl. | Spec. Grav. at 15° C. Water at 4° C. | Per Cent. HCl. |
|---|---|---|---|
| 1000 | 0.16 | 1110 | 21.92 |
| 1010 | 2.14 | 1120 | 23.82 |
| 1020 | 4.13 | 1130 | 25.75 |
| 1030 | 6.15 | 1140 | 27.66 |
| 1040 | 8.16 | 1150 | 29.57 |
| 1050 | 10.17 | 1160 | 31.52 |
| 1060 | 12.19 | 1170 | 33.46 |
| 1070 | 14.17 | 1180 | 35.39 |
| 1080 | 16.15 | 1190 | 37.23 |
| 1090 | 18.11 | 1200 | 39.11 |
| 1100 | 20.01 | | |

—Am. Drug., July 1891, 223; Zeitschr. f. analyt. Chemie, 1891, xxx., 700.

*Chlorinated Lime* and *Chlorinated Soda.*—See under *Liquores* and *Pilulæ.*

BROMINE.

*Recognition in Presence of* Cl *and* I.—See under *Chlorine.*

*Hydrobromic Acid—Preparation.*—M. Fileti and P. Crosa find the following process convenient and economical for the preparation of considerable quantities of the acid: A mixture of 1 part of red phosphorus, 2 parts of water, and sufficient sand to form a paste, is introduced into a flask, 10 parts of bromine then gradually added by means of a funnel provided with a stopcock, the flask gradually warmed, and the mixture of hydrogen bromide and bromine vapor passed through a deep glass jar filled with a mixture of red phosphorus and asbestos, impregnated with concentrated hydrobromic acid. Every trace of bromine is thus effectually retained, and the process is continued, requiring no attention beyond an occasional shaking of the flask.—Journ. Chem. Soc., 1891, 976, from Gazzetta, xxi., 64.

*Hydrobromic Acid—By Electricity.*—G. S. Newth passes a current of hydrogen and bromine vapor over a spiral of platinum wire, heated to bright redness by means of an electric current. A glass tube is fitted at each end with a cork, carrying a stout wire through a short tube, both wires

being connected by means of a short spiral of platinum wire. One end is connected to a small wash-bottle containing bromine, through which a current of hydrogen can be bubbled. The other end is attached to a tube dipping into a vessel of water, for the absorption of the gas. Hydrogen is first slowly passed through the tube to expel the air, then the platinum wire is heated by an electric current. Combination takes place in contact with the hot wire, and the color of the ingoing gases is entirely removed; the contents of the tube beyond the platinum are perfectly colorless so long as even a slight excess of hydrogen is passing. The vessel containing the bromine may advantageously be heated to 60° C.—Chem. News, 1891, lxiv., 215.

August Harding published a similar method in 1881 (see Proceedings 1882, xxx, 274), using, however, a platinum tube, containing some spirally twisted platinum foil, which was heated by a Bunsen burner.—New Remedies, 1882, 43, from Ber., 1881, 2085, Rep.)

*Sodium Hypobromite.*—Denigès has ascertained that the red color sometimes observed in solutions of this salt is due to the action exercized upon the manganese in the glass of the bottle, and the formation of a minute quantity of potassium permanganate. He does not think, however, that this coloration will interfere with the use of the reagent in the determination of urea.—Pharm. Journ. Trans., Feb., 1892, 694, from Journ. Pharm. Chim., 1892, xxv., 54.

*Bromides and Bromates*, see under the respective bases.

*Bromo-Chloralum—Preparation.*—This well known proprietary disinfectant, an analysis of which by A. B. Lyons will be found in the Proceedings 1875, xxiii., 521, can be made as follows:

Dissolve 1 kgm. of alum in 2½ litres of boiling water, dilute with 25 litres of water, and precipitate completely with ammonia. The washed precipitate of alumina is transferred to a closed vessel, 30 gm. of bromine added, and sufficient dilute hydrochloric acid (1 : 1) until dissolved. Finally sufficient water is added to bring the measure up to 4½ litres; filter, if necessary.—Hoffmann, Pharm. Rundschau, N. Y., 224.

## IODUM.

*Recognition in presence of Bromine and Chlorine.*—See under *Chlorine.*

*Iodine.*—Norway has entered the list of those countries which produce iodine; by utilizing the sea-weed which is found in great abundance on the coast.—Chem. Drug., Aug. 1891, 346.

*Iodine—Novel Administration.*—Dr. F. P. Mann recommends to give iodine in glucose, stating that it is so "occluded" by the glucose that it can not readily be detected by the taste or odor, and can therefore be administered in much larger doses than formerly without producing unpleasant symptoms. Besides this, the doctor thinks that the iodine so combined

may readily be absorbed into the circulation, to be liberated during the morphological changes that occur prior to the formation of new blood corpuscles. His favorite formula is: Iodine, 30 grains; dissolved in 4 ounces of water by means of 150 grains of potassium iodide; to this solution are added 12 ounces (fluid?) of sugar house molasses, and 120 minims of essence of gaultheria. He cautions against the use of simple syrup. The commencing dose is a teaspoonful between each meal, in a little water.—Am. Drug., July 1891, 201, from Med. Record.

*Iodine—Peculiar Behavior.*—M. C. Traub on preparing chlorobutyric ether by passing chlorine into butyric acid containing a small quantity of iodine, observed that the pale yellow liquid, on being heated to about 120° C., changed to violet, and yielded a distillate of the same color, which on lowering the temperature, changed back to the original pale yellow. He explains this behavior by assuming a dissociation of the iodine molecule. This explanation is the same which Gautier and Charpy give in accounting for the variation in color of solutions of iodine in different menstrua. —Schweiz. Woch., 1892, 11.

*Iodine—Volumetric Solution.*—J. H. Hoseason, finding that the volumetric solution of iodine deteriorates after some time, set about devising a method for ascertaining the strength of the solution without using arsenious acid as a factor. Soda solution was tried, but the end reaction was not sufficiently distinct; nitrate of silver solution was found to be unreliable, as a portion of the iodide in the iodine solution combined with the silver at the same time. A more satisfactory method was to add a known measure of standard potassium bichromate solution to a solution of potassium iodide in water with sufficient dilute sulphuric acid. Iodine is then set free in the proportion of three molecules to one of potassium bichromate. Subsequent titration of this iodine with hyposulphite solution determines the strength of the latter, and from this hyposulphite solution an unknown solution of iodine might be at once standardized or corrected. Hoseason also finds fault with the pharmacopœial (Br. Ph.) directions for preparing the iodine solution, and proposes the following:

Mix intimately in a mortar one part of potassium iodide and four parts of iodine, and sublime. When cool, place the sublimate in an exsiccator for two hours. Of this chemically pure iodine weigh off quickly on a paraffined paper the quantity required, and make up to the proper quantity with distilled water, so that each 100 c.c. contains 1.27 grain of pure iodine. On examining several samples of commercial iodine he found them of an unexpectedly good quality, containing from 96.6 to 99.4 per cent. of iodine.—Pharm. Journ. Trans., Jan. 1892, 583.

*Iodine—Solubility in Chloroform.*—W. Duncan takes exception to the statement of several authorities (also of U. S. Ph.) that iodine is "very" soluble in chloroform. He found it impossible to dissolve more than one

grain in one drachm of chloroform. On repeating the experiments with iodine, purified by sublimating it with one-fourth of its weight of potassium, and estimating it carefully by sodium thiosulphate, he found that the solubility at 10° C. was not higher than 1 : 56.6. In order to get good results in titrating he found it necessary to add some alcohol to the chloroformic solution before adding the water, as otherwise the water would be thrown out. It is also necessary to use starch as an indicator, as the solution apparently becomes colorless before all the free iodine is taken up.—Pharm. Journ. Trans., Dec. 1891, 544.

*Iodine—Solution in Liquid Paraffin.*—A solution of iodine in liquid paraffin is stated to be preferable to the tincture, because it is said to keep better, and because the iodine is better absorbed by the skin. It is not advisable, however, to make the solution stronger than 3 or 5 per cent., otherwise the iodine is liable to separate on standing. The best way in which to proceed is to dissolve the iodine in a little ether, and then to add the liquid paraffin.—Zeits. Oester. Apoth.-Ver., 1892, 222, from Bull. Soc. Roy. Pharm., 1892, 13.

*Iodine Preparations.*—W. G. Mackenzie communicates a very practical wrinkle in making solutions of iodine with potassium iodide. This is to add to both an equal weight of water, and allow them to stand without agitation until dissolved, which will take a surprisingly short time, and then add the remainder of the water, or the alcohol, as the case may be.—Pharm. Journ. Trans., Jan. 1892, 602. (The same principle is followed in making Fowler's solution.—Rep.)

"*Alkaline Iodide.*"—Charles Rice disapproves of the term "alkaline iodide" as denoting the iodide of an alkali metal, because ordinarily this expression would be understood to refer to an iodide having an alkaline reaction (regardless of the base). He therefore proposes to call iodides of alkali metals "alkali iodides."—Am. Drug., Aug. 1891, 241.

*Alkali Iodides—Necessity of Examining for Iodates.*—In putting up a mixture containing sparteine sulphate and sodium iodide, Julliard noticed a black precipitate which he at first supposed to be iodine, but on applying appropriate tests found to be sparteine iodosulphate, the presence of which on reflection he could easily account for. Sparteine sulphate is an acid salt, and his sodium iodide happened to contain iodate; from the latter in the presence of diluted acids will be formed hydriodic acid and iodic acid, and ultimately a little iodine will be liberated which dissolves in the iodide, and then the solution will contain Bouchardat's reagent for alkaloids (alkaline iodo-iodide) which of course precipitates the sparteine.—Pharm. Post, 1891, 688, from Union Pharm.

*Hypoiodous Acid.*—A. Schwicker gives an additional proof for the existence of this acid (HOI). On adding urea to freshly prepared solution of iodine in soda solution, a lively evolution of nitrogen takes place. This

reaction is analogous to that of sodium hypobromite on urea.—Pharm. Zeitg., 1892, 18, from Chem. Zeit., 1891, 630.

*Iodides* and *Iodates*.—See under the respective bases.

*Estimation in Urine*.—See *Urine*.

FLUORINE.

*Fluorine—Suggestion*.—F. Davis suggests, based on the experiments of Moissan, that fluorine may be a modified form of oxygen. He refers to its action upon metals with the same affinities as we find with oxygen. Gold and platinum but slightly acted upon; mercury seized upon with the greatest avidity; zinc, aluminium, magnesium, burn with great brilliancy in combining with it; carbon burns freely in it, and hydrogen enters into combination with it with great vehemence, and many other points of resemblance will be found.—Pharm. Journ. Trans., Feb. 1892, 668.

*Fluorine*.—The theory of Davis, just quoted, is refuted by E. J. Parry.—Pharm. Journ. Trans., Feb. 1892, 688.

*Fluorine*.—H. Moissan places fluorine at the head of the halogen family; there is, however, a difference in the respective behavior of fluorine and chlorine with other elements. Its compounds with non-metals are more volatile than the corresponding chlorides. With metals it yields products, the melting point of which is higher than that of the corresponding chlorides. Silver fluoride is very soluble in water, while the chloride is insoluble. With aluminium the fluoride is insoluble in water and very stable, while the chloride is easily decomposed. The action upon organic hydrogen compounds is so violent that no intermediate compounds are formed. Fluorine decomposes water in the cold, yielding ozone of such a concentration that it appears with the fine blue color indicated by Hautefeuille and Chappuis.—Chem. News, 1891, lxiv., 126,; from Bull. Soc. Chim., v.

*Fluorine—Determination*.—Ad. Carnot proposes a new process of determination, which is neither very complicated, nor requires the observance of very minute precautions. His method is easy of execution, and is not interfered with by the presence of carbonates or of organic substances. It is founded, like several methods already known, on the disengagement of fluorine in the state of gaseous silicon fluoride; its novelty consists in the method of determining the volatile compound. In place of calculating it by the difference of two weighings (Woehler and Fresenius), or according to the weight of the calcium fluoride obtained after a tedious separation of the silica (Berzelius, Rose, and recently Lasne), Carnot receives the silicon fluoride in a rather concentrated solution of pure potassium fluoride, with which it forms a precipitate of potassium silicofluoride, the weight of which enables us to calculate the fluorine, and, if needful, the silicon. $SiF_2 + KF = KF.SIF_2$, or $F_4 + 2KF = K_2F_6$. For the details of the opera-

tion reference may be had to the original article.—Chem. News, 1892, lxv., 198; from Comptes rendus, 1892, cxiv., 750.

*Hydrofluoric Acid—Pipette.* - G. P. Vanier has devised a pipette which is not attacked by hydrofluoric acid. It is made of ceresin. A mould of paper, provided with a core of glass tubing (drawn out to a point at one end) is fastened in an upright position, and fused ceresin poured into the space between paper and core. When cooled, paper and glass tube are removed, and a pipette of ceresin remains; it merely needs a rubber nipple drawn over the wide end, and the pipette is ready for use.—Zeits. analyt. Chem., 1892, 198; from Jour. analyt. Chem. iv., 48.

(Some years ago it was recommended to make the reagent bottle for hydrofluoric acid of ceresin.—Reporter.)

*Hydrofluoric Acid—Keeping.*—According to R. Benedikt, platinum vessels and flasks of hard rubber are much better suited for keeping the acid than gutta percha. The same applies to hydrofluosilicic acid.—Zeits. Oester. Apoth.-Ver., 1891, 433; from Chem. Zeitg., 1891, 881.

*Fluorides.*—See under the respective bases.

## PHOSPHORUS.

*Phosphorus—By Electricity.*—A factory has been erected near Wednesfield, England, for the extraction of phosphorus by electricity. The current is conducted from the dynamo to the furnace, and generates intense heat, by means of powerful arc carbons. The furnace occupies a comparatively small space, being only about eight feet square, and less in height. It is fitted with a hopper at the top which is so constructed that the phosphates and coal can be poured in without any vapor or heat escaping. The whole of the ingredients placed within, with the exception of a little slag, which is drawn occasionally by a process of tapping, pass away in a vaporous condition through pipes and condensers, where the phosphorus is deposited in such a pure condition that it requires but little refining.—Chem. and Drug., July 4, 1891, 20.

*Phosphorus—Purification.*—Denigès purifies stick phosphorus by introducing the sticks into a flask, covering them with a 3 to 4 cm. high layer of sodium hypobromite, and heating the flask on a boiling water-bath, stirring from time to time until the mass appears perfectly translucent, and the last particles of red phosphorus have disappeared. Pour out the mass into cold water, wash it, and melt it again under distilled water. Any arsenic present will be removed at the same time.—Chem. Zeitg., 1892 (Rep.), 99; from Jour. Pharm. Chim., 1892, xxv, 237.

*Phosphorus—Antidote.*—Arpad Bokai and Koranyi recommend potassium permanganate in one-fifth of 1 per cent. solution as a reliable antidote, forming orthophosphoric acid, peroxide of manganese and potassa; in the stomach manganic chloride will probably be formed. Even a 1 per

cent. solution of potassium permanganate does not injure the coat of the stomach.—Pharm. Post, 1891, 1009; from Pest. Med.-Chir. Pr.

*Black Phosphorus.*—F. A. Flueckiger has examined into the supposed existence of black phosphorus. He prepared it by heating powdered phosphorus with ammonia, shaking frequently. The phosphorus blackens gradually, and an odor of hydrogen phosphide is noticed. On repeating the treatment with ammonia the color darkened still more, and finally there remained a black powder, permanent in the air and non-inflammable. It proved to be *arsenic.* The supernatant liquid contains chiefly ammonium salts of the lower acids of phosphorus. Flueckiger comes to the conclusion that a *black phosphorus* does not exist, but that the colorless phosphorus contains dissolved arsenic, due to the crude sulphuric acid employed in the manufacture of phosphorus, and that this arsenic remains after ammonia has removed all phosphorus as hydrogen phosphide and acids. At times red phosphorus will be noticed, giving a reddish or brown color to the residue, which, however, finally gives way to the black of the arsenic.—Chem. Zeitg. (Rep.), 1892, 181, from Archiv Pharm., ccxxx., 159.

*Phosphorus Pentafluochloride.*—(C. Poulenc.) $PF_3Cl_2$ is a colorless gas, possessing an irritating odor, not combustible in the air, and instantly absorbed with decomposition by boiled water. It is absorbed by alkaline solutions, lime water and baryta water. Its theoretical density is 5.46; as determined by Chancel's apparatus, 5.40. At ordinary pressure it is liquefied at a temperature of about —8° C.; at 250° C. it is decomposed, yielding gaseous phosphorus pentafluoride and solid phoshorus pentachloride. With ammonia phosphorus pentafluochloride forms

*Fluorophosphamide*, a white, light solid, soluble in water. At 115° C. it yields with sulphur gaseous phosphorus sulphofluoride and sulphur chloride.

*Phosphorus sulphofluoride* has a peculiar offensive odor, is rapidly absorbed by an alkaline solution, and is split up in contact with water, yielding hydrofluoric acid, phosphoric acid and hydrogen sulphide.—Chem. News, July 31, 1891, 60; from Comptes rendus, cxiii., 1891, 75.

*Superphosphates—Soluble Phosphoric Acid Compounds.*—J. Stoklasa has studied the action of dicalcium phosphate and tricalcium phosphate on monocalcium phosphate.—Journ. Chem. Soc., 1891, 880, from Land. Vers. Stat., xxxviii., 401–410.

*Phosphoric Acid—Estimation in Slags.*—Vincent Edwards communicates a method for estimating this acid in slags which resisted treatment with nitrohydrochloric acid, which method probably may be of use with other refractory material. He merely boiled the slag, which contained much silica and carbon, with concentrated sulphuric acid until almost white, which took an hour. On cooling the acid solution was diluted with water, and the phosphoric acid precipitated by citro-magnesic solution and ammonia, etc.—Chem. News, 1891, lxiv., 275.

*Phosphates (Natural)—Estimation of Acid and Moisture.*—The Am. Drug. (1891, 303) contains the methods adopted by the Off. Agricult. Chemists in 1890, for the details of which the readers are referred to the original article; we give here merely the different headings: (1) Preparation of sample. (2) Determination of moisture. (3) Water-soluble phosphoric acid. (4) Citrate-insoluble phosphoric acid. (5) Total phosphoric acid. (6) Citrate-soluble phosphoric acid. (7) Preparation of reagents.

*Glacial Phosphoric Acid.*—John Hodgkin has analyzed several samples of German and English makes of this acid, with the results noted below. The constituents of importance to be ascertained were: Free hydric metaphosphate, combined metaphosphate, ammonium, sodium, water. Hodgkin adopted the following method: The glacial acid was boiled foı one hour to effect its conversion into orthophosphoric acid; the acid was then diluted to a strength of ten per cent., and 25 c.c. of this titrated directly with normal soda, using one drop of dilute methyl-orange as an indicator, the reaction being the sharp change from faint pink to an almost imperceptible lemon-yellow. The number of c.c. is noted, each c.c. being equivalent to 0.08 gm. of $HPO_3$. Now, whilst the dihydrosic phosphate is neutral to methyl-orange, it is acid to phenolphthalein, and we can, therefore, with this latter indicator, volumetrically determine the amount of combined acid. To the same solution, now almost colorless, add one drop of alcoholic phenolphthalein, and continue to run in the soda until the reaction point (a sudden change to a pink or crimson tint) is reached; note the number of c.c. Since the methyl-orange shows the amount of free acid, and the phenolphthalein the total acid, by subtracting the former number of c.c. from the latter, the amount of combined acid will be known. This method is better than the usual uranium method, which only shows the total phosphate, without discriminating. The use of methyl-orange enables one to ascertain the available $HPO_3$ at once, since this acid reacts directly with the indicator and soda, so that no boiling is required. Ammonia was estimated by distilling with excess of soda into deci-normal acid. Soda was estimated as sodium chloride by Bettendorf's method: Allow 3 to 4 gm. of the glacial acid to stand for 24 hours with 50 c.c. of fuming hydrochloric acid (sp. gr. 1.190), filter the resulting sodium chloride through spongy platinum, wash several times with fuming hydrochloric acid, ignite and weigh. (1 part of sodium chloride requires 1348 parts of acid of the above strength for solution.) The samples were: (A) by the ammonia process; (B) and (C) English make; (D) and (E) German make; (F) European make obtained in the U. S.; (G) made by adding sodium phosphate to a solution of ammonium phosphate, and calcining; (H) from microcosmic salt.

| | Free $HPO_3$. | Combined $HPO_3$. | Total $HPO_3$. | Total by uranium. | Total base. | $NH_4$. | Na. | $Na_2HPO_4.12H_2O$. | $H_2O$. | As. |
|---|---|---|---|---|---|---|---|---|---|---|
| A. | 48.00 | 43.52 | 91.52 | 91.84 | 8.05 | 8.05 | ...... | ............ | tr. | tr. |
| B. | 52.80 | 40.00 | 92.80 | 93.14 | 7.82 | 6.48 | 1.34 | 10.40 | tr. | 0.08 |
| C. | 46.08 | 39.36 | 85.44 | 85.40 | 9.79 | 0.07 | 9.72 | 75.53 | 5.60 | tr. |
| D. | 31.68 | 52.80 | 84.48 | 84.98 | 14.09 | 0.05 | 14.04 | 109.30 | 2.40 | tr. |
| E. | 36.48 | 47.36 | 83.84 | 83.70 | 13.49 | 0.06 | 13.43 | 104.48 | 3.25 | tr. |
| F. | 42.21 | 37.89 | 80.10 | 80.41 | 10.20 | ...... | 10 20 | 79.30 | 10.10 | tr. |
| G. | 44.16 | 46.72 | 90.88 | 90 65 | 10.10 | 4.87 | 5.23 | 40.67 | tr. | tr. |
| H. | ........ | ........... | ........ | 78.12 | 22.50 | ...... | 22.50 | | | |

—Pharm. Journ. Trans., Sept. 1891, 217.

*Phosphorescence of Minerals under the Influence of Heat and Light.*—By H. Becquerel.—Journ. Chem. Soc., July 1891, 776; from Compt. rend., cxii., 557–563.

*Phosphates, Phosphides, Phosphites, Hypophosphites.* See under the respective bases.

BORON.

*Boron—Amorphous.*—H. Moissan states that when we cause an alkaline metal to act upon boric acid, the reaction takes place with a great liberation of heat, by means of which the greater part of the boron which has been set free combines with the excess of the alkaline metal, and with the metal from the apparatus in which the reaction has been effected. If we afterwards exhaust the product with water and hydrochloric acid, we obtain, after drying a mixture of boron, sodium, and iron borides, boron hydride and nitride, and hydrated boric acid. This is the mixture which hitherto has been regarded as amorphous boron. The author finds the boron of Gay-Lussac and Thenard, that of Deville and Woehler, and that of Berzelius, impure.—Chem. News, 1892, lxv, 119; from Comptes rendus, 1892, cxiv.

*Boron Bromide—Compound with Hydrogen Phosphide.*—A. Besson.—The bromide absorbs hydrogen phosphide at common temperature, forming a very light amorphous solid, which fumes and ignites spontaneously on exposure to the air. It can be examined only in an atmosphere of perfectly dry carbon dioxide. Its formula is $BBr_3PH_3$.

*Boron Phosphide*, PB, is a brown solid, insoluble in water, but soluble in concentrated boiling alkalies, with formation of hydrogen phosphide. It is decomposed with brisk incandescence by monohydrated nitric acid. It burns in the cold if thrown into chlorine gas. Chem. News, July 31, 1891, 61; from Comptes rendus, cxiii, 1891, 78.

*Boron Teriodide—New Reactions.*—On projecting boron teriodide into dry, cold chloroform, it is dissolved, and the mass quickly congeals. After a few days the gelatinous matter disappears and the boron of the vessel is filled with a fine crystallization of iodoform, whilst vapors of boron chloride escape continually. Phosphorus reacts energetically

upon boron teriodide. If we add ordinary phosphorus free from water to a solution of the iodide in pure dry carbon bisulphide, a dense reddish powder is produced, from which, on heating, evolve small quantities of phosphorus and phosphonium iodide. The residue is a white powder containing phosphorus and boron. This

*Boron Phosphide*, infusible at a red heat, is not acted upon by nitric monohydrate. It is decomposed by aqueous vapor into hydrogen phosphide and boric acid, and resembles in its properties the boron nitride of Deville and Woehler.—Henry Moissan—Chem. News, July 24, 1891, 49; from Comptes rendus, cxiii, 1891, No. 1.

*Boron Phospho-Iodide.*—By the action of a solution of phosphorus in perfectly dry carbon bisulphide upon a solution of iodide of boron in the same solvent, $PBoI_2$ is formed already in the cold. This phospho-iodide is an amorphous, dark red powder, which volatilizes between 170° and 200° C., the vapors forming on cooling red crystals. It melts in vacuum at 190° to 200° C. It is very little soluble in carbon bisulphide, and insoluble in the tetrachloride and in benzol. It is very hygroscopic, finally decomposing. Heated in hydrosulphuric acid, the sulphides of boron and phosphorus are formed, together with hydriodic acid. Diluted nitric acid oxidizes it, forming phosphoric and boric acids; with concentrated acid the same products are formed, but with ignition. It ignites with chlorine, forming boron and iodine chlorides and phosphorus pentachloride. By the action of powdered magnesium and sodium upon the solution in carbon bisulphide is formed PBoI, which also is obtained on heating it in a current of hydrogen at 160° C. PBoI is an amorphous red powder, hygroscopic, and volatilizing in vacuum at 210° to 250° C., the vapors on cooling forming orange-yellow crystals. It does not ignite with concentrated nitric acid, but is decomposed, liberating iodine.—Moissan, Chem. Zeitg. (Rep.), 1891, 315, from Comptes rendus, cxiii., 1891, 624.

*Boron Fluoride.*—According to G. Patein, boron fluoride combines in definite proportions, molecule for molecule, with the nitrides, both of the fatty and the aromatic series.—Chem. News, July 31, 1891, 61, from Comptes rendus, cxiii., 1891, No. 2.

*Boric Acid—Estimation of Small Quantities.*—According to F. Parmentier, the difference in the behavior of helianthin and litmus or orcein towards boric acid and borates can be made use of in the estimation of minute quantities of boric acid. The residue of a mineral water, after removal of the silica, is dissolved in hydrochloric acid and treated with ammonium nitrate and ammonia to precipitate iron, alumina, manganese, and arsenic and phosphoric acids. The filtrate is then acidified with hydrochloric acid, and divided into two equal portions, both of which are titrated with sodium carbonate, one with helianthin, as indicator, and the other with orcein. Yellow (alkaline) helianthin is not affected by boric

acid or borates, whilst alkaline litmus, or still better orcein, changes color when the base is partially or entirely saturated; when the alkali is soda, the point is that at which the biborate is formed. In this way quantities of boric anhydride as minute as 1.8–3.8 mgm. per litre have been found.—Jour. Chem. Soc., 1891, 1552, from Comptes rend., cxiii., 41–43.

*Boric Acid—Compound with Borax.*—In treating wounds, it is often desirable to use a solution containing more than 4 per cent. of boric acid, the extent of its solubility in water. Jaenicke proposes for this purpose a mixture of equal parts of boric acid and borax, of which 16 per cent. are soluble in water at ordinary temperature. It is non-irritating, non-poisonous, and efficacious: being soluble to the extent of 30 per cent. in water at the temperature of the blood, the solution can be applied to the interior of hollow complex organs, when on cooling the crystals of the compound separate.—Drug. Circ., 1891, 276, from Therap. Monatsh.; Am. Journ. Pharm., 1892, 97.

J. M. Maisch states that the proportions given correspond to rather more than six molecules of boric acid, $B(OH)_3$, for one of borax, and the resulting product consists chiefly of Atterberg's salt (1873). $B_4O_5(OH)_2.3B_2O_3 + 10H_2O$. In prescriptions it has been designated "boro-boric acid."—Am. Journ. Pharm., 1892, 99.

*Boric Acid—Not Innocuous.*—Dr. Lemoine points out that boric acid is not such a harmless antiseptic as generally supposed.—Am. Journ. Pharm., 1892, 192, from Monit. Pharm., 1892, 1019.

*Boric Acid.*—P. Charles found two kinds of boric acid in French pharmacies, the one in flakes, which is generally known, and the second a prismatic variety, which differs markedly from the first. The ordinary kind forms pearly flakes or hexagonal plates, is light, and is unctuous to the touch, while the other variety is in prisms, heavy, and does not possess the unctuous touch. The author found that, (1) the solubility in strong alcohol is the same with both varieties; (2) the insoluble portion, about 1 per cent., is principally sulphates in the flakes, and chlorides in the prismatic acid; (3) there is usually a larger proportion of an empyreumatic organic body in the prismatic variety than in the other; (4) both varieties, when purified, crystallize in plates. The author prepared some of the boric acid from borax, using in the one case sulphuric, and in the other hydrochloric acid. In the first case the boric acid crystallizes on the surface in plates, while in the second it crystallizes in the bottom of the receptacle. If the flaky acid be crystallized from a solution containing a chloride or hydrochloric acid, it will separate in the form of prisms. The crystals in this case are separate, and as they can be obtained quite small in size, the purification is not so difficult, since they cannot have much of the mother liquor adhering after the first washing. Another point in which these varieties differ is in the readiness with which they are reduced to powder, the

prismatic variety powdering very easily.—Am. Journ. Pharm., 1892, 312, from Rep. Pharm., 1892, 102.

SILICIUM.

*Silicon—New Form.*—H. N. Warren obtained it in perfect and well developed oblique octahedra, by subjecting potassium silicofluoride to an intense heat in contact with impure aluminium. The new modification is obtained in large, perfect crystals, having a full metallic lustre, and resembling crystals of cast iron, such as are sometimes seen on breaking a "pig" of that substance; it is infusible, and insoluble in all acids except hydrofluoric.—Jour. Chem. Soc., July 1891, 799; from Chem. News, lxiii., 46.

*Silicon—Action of Magnesium.*—Silica, when heated with magnesium, is converted, with evolution of light and scattering of the mixture, into magnesium silicide and amorphous silicon. Silicates are also reduced by magnesium. If an excess of silica be employed, no magnesium silicide is produced, but only silicon.—C. Winkler, Jour. Chem. Soc., 1891, 801; from Ber., xxiv., 873.

*Silicon—Reducing Action.*—H. N. Warren states that metallic or graphitoidal silicon—itself one of the most stable and inert substances—when in admixture with a large number of metallic oxides, becomes at once oxidized, while the metallic oxide becomes reduced. With copper, lead, and all readily reducible oxides, either a silicide or—when the oxide is in excess—the pure metal is obtained. Warren further states that a mixture of equal parts of finely-divided silicon, aluminium and litharge, when heated together, explodes with fearful violence, even cast-iron being shattered.—Chem. News, 1891, lxiv., 75.

*Silicon Bromiodides.*—A. Besson has obtained $Si_2Br_3I$ as a colorless liquid which distils at 192° and which, on refrigeration, presents a very distinct phenomenon of superfusion. $Si_2Br_2I_2$ is a white solid, which melts at +38° and distils at 230–231° C. $Si_2BrI_3$ is a white solid, melting at 53° and distilling at 255°.—Comptes rendus, cxii., No. 25, through Chem. News, July 10, 1891, 26.

*Silicon Chloride—Action of Hydrogen Iodide.*—Dry hydrogen iodide has no action on silicon chloride at ordinary temperature, but at a high temperature products of partial substitution are obtained. Hydrogen iodide mixed with vapor of silicon chloride is passed somewhat rapidly through a glass tube heated to redness; the product is agitated with mercury to remove free iodine, and it is then fractionated. The author describes *Silicon iodochloride*, $SiCl_3I$; the *diiododichloride* and the *chlorotriiodide*, $SiClI_3$.—A. Besson, Journ. Chem. Soc., July 1891, 800, from Comp. rend., cxii., 611.

*Silicon Chloride—Action of Hydrogen Bromide.*—A. Besson, Journ. Chem. Soc., Sept. 1891, from Comptes rendus.

*Silicium Selinide.*—Paul Sabatier obtained this compound by heating to redness crystalline silicon in a current of perfectly dry hydrogen selenide. The transformation takes place without appreciable incandescence at a temperature a little higher than the boiling point of selenium. The composition of the compound is represented by the formula $SiSe_2$.—Chem. News, 1891, lxiv., 73, from Comptes rend., July, cxiii., 132.

## CARBON.

*Carbon—Action of Magnesium.*—Magnesium burns at a red heat in carbonic anhydride to form amorphous carbon; when heated with carbonates, however, an explosive action takes place. The reduction is generally accompanied with the formation of magnesium carbide and carbon monoxide, which latter at a higher temperature is reduced to carbon.—C. Winkler, Journ. Chem. Soc., 1891, 801, from Ber., xxiv., 873.

*Graphite—Formation by Contact Metamorphosis.*—R. Beck and W. Luzi, Journ. Chem. Soc, Sept. 1891, 989, from Ber., xxiv., 1884.

*Graphite.*—A curious property of graphite has been observed by Schafhaeutl, Marchand and Brodie that when finely-powdered graphite is boiled with concentrated sulphuric acid, a mixture of sulphuric and nitric acids, sulphuric acid with potassium bichromate or chlorate, and subsequently washed and ignited, it swells up and assumes a characteristic vermiform or moss-like appearance. W. Luzi finds that concentrated nitric acid, or a solution of potassium permanganate in sulphuric acid also effects this change, which likewise takes place when coarsely powdered graphite is simply moistened with concentrated, red, fuming nitric acid, and ignited in a flame on platinum foil. The worms attain a size of 2 cm. in circumference and 15 cm. in length.—Journ. Chem. Soc., 1892, Abstract, lxii., 406, from Ber., 1891, xxiv., 4085.

*Carbon monoxide* has the property of uniting in the cold with nickel, iron, and probably with other metals taken in a suitable condition, forming carbonyles, analogous to compound metallic radicles. The iron compound —ferro-carbonyle—is obtained by reducing ferric oxide (precipitated, washed and dried with care) in a slow current of hydrogen at the lowest temperature possible; the reaction with the monoxide takes place at about 45° C., and the product is a gas.—Berthelot, Comptes rendus, cxii., No. 24; through Chem. News, July 3, 1891, 12.

*Carbonic Oxide—Electrical Phenomena.*—G. Haussknecht observed a pale greenish-violet light on allowing liquid carbonic oxide, contained in an iron cylinder, to evaporate rapidly into a bag of sail cloth; electric sparks of 10–20 cm. in length shooting out through the pores of the bag. These electrical phenomena are probably caused by the rushing of the carbonic oxide through the fine openings in the sides of the bag, whereby it is strongly rubbed.—Jour. Chem. Soc., July 1891, 777, from Ber., xxiv., 1031.

*Carbonic Dioxide—Automatic Estimation.*—A. Wolpert has devised a very ingenious automatic means (it cannot well be called an apparatus) for roughly estimating the purity of the air in sick rooms, based on the influence which carbonic acid has on a solution of phenolphthalein. A solution of soda colored red with phenolphthalein is covered with a film of oil, to prevent the action of the air in the room until the proper time. By means of a syphon the solvent is allowed to drop into a white, transparent glass at the rate of one drop every two minutes. As the solution drops from the syphon the carbon dioxide of the air will come in contact with it for a constant period of time, and decolorize it more or less. By reference to a color scale the percentage of carbon dioxide in 1000 parts of air can be approximately learned.

The air is considered *very pure* when it contains less than 0.5 per mille; *pure* with 0.5 to 0.7 p. m.; *passable* with 0.7 to 1 p. m.; *bad* with 1 to 2 p. m.; *very bad* with 2 to 4 p. m.; *altogether bad* with more than 4 p. m. —Drug. Circ., 1892, 10, from Fortschr. Krankenpflege.

*Carbonic Anhydride—Estimation.*—J. C. Wharton proposes the following method, based on the double affinity of sulphuric acid for the base of the salt and for water, by which it evolves dry carbon anhydride from dry compounds, and absorbs moisture from the gas if it be eliminated in a moist condition, which, however, is not likely to be the case unless there is a considerable amount of moisture in the carbonate. As the moisture in the air is variable, the sulphuric acid should be adjusted to it by exposure in an open dish for several hours until nearly saturated.

A weighed quantity of the carbonate is placed in a tared test tube (about six inches long and half an inch wide), which is loosely stoppered by a cork, through which passes an ordinary dropper or rubber-bulbed pipette, said pipette containing sufficient of moderately strong sulphuric acid to thoroughly neutralize the carbonate. By regulated pressure of the rubber bulb the acid is allowed to slowly trickle down to the alkali; when the reaction is about complete and the heat has subsided somewhat the stopper is removed and the gas poured out; the tare is taken from time to time until the loss of weight ceases. The difference between the first and the last weighing will be the weight of carbonic anhydride.—Drug. Circ., 1891, 251, from Drugman.

*Carbon Dioxide—Liquid.*—The principal carbonates employed are:

| | Per cent. of dioxide. | 100 parts require of sulphuric acid (1.830). | Hydrochloric acid (1.120). |
|---|---|---|---|
| Magnesite | 52.38 | 125 | 375 |
| Dolomite | 47.83 | 112.5 | 337.5 |
| Chalk | 44.00 | 100 | 339 |
| Sod. bicarb. | 52.39 | 60 | 180 |

The evolved gas is passed into large wash-bottles, the first containing a 10 per cent. solution of ferrous sulphate, the second a 10 per cent. solution of sodium carbonate, and the last one pure water; from these it is carried into a reservoir. On the large scale carbon dioxide is produced from the combustion of coke, the gases of which contain about 18 per cent. The gases are purified by passing into wash-bottles half full of water, which retains the sulphuric acid, and then they are forced into an absorbent apparatus containing a solution of sodium carbonate, which is constantly stirred. The nitrogen and oxygen escape into the air, while the carbon dioxide is retained, changing the carbonate into bicarbonate. The latter, on being heated to boiling, parts with its surplus of dioxide, and becomes a carbonate solution, which is then used over again quite indefinitely. Of late years the carbon dioxide of natural grottoes (Italy, Austria, France) has been used, being fixed by a solution of sodium carbonate. The gas, however, obtained is thoroughly dried, and then subjected to a gradually increasing pressure by a series of hydraulic pumps, and finally liquefies while escaping from the last into a coiled pipe, which is kept cold.—Drug. Circ., 1892, 28, from Schweiz. Woch. Pharm.

*Carbon—Liquefied Anhydride for the Rapid Filtration and Sterilization of Organic Liquids.*—A long cylindrical copper or steel tube containing a biscuit porcelain Pasteur-Chamberland filter is connected with a cylinder containing liquid carbonic anhydride. The gas not only drives the liquid through the filter, but under the high pressure, especially if its action is prolonged and the liquid is heated to 40° C., it exerts a very powerful bactericidal and sterilizing effect. The richness of the filtrate in colloids increases with the pressure, and by varying the pressure, it is possible to obtain from one and the same liquid (e. g., pancreatic juice) filtrates having very different properties.—A. d'Arsonval, Jour. Chem. Soc., July 1891, 854, from Compt. rend., cxii., 667.

*Carbon Tetrachloride—Use.*—Lever and Scott recommend to replace the inflammable carbon bisulphide for extraction purposes with the tetrachloride, which is much safer, though at present rather high in price. It is prepared by mixing the bisulphide with 2 to 12 per cent. of iodine, or the equivalent quantity of bromine or antimonium pentachloride, and passing dry chlorine gas through it; it will be necessary to provide the inlet tube with a rose. The mixture is distilled in fractions, and treated with soda or potassa to remove the iodine and traces of chloride of sulphur. —Chem. Zeitg., 1891, 707.

*Carbon Tetraiodide.*—When carbon tetrachloride is acted upon by boron teriodide, there is readily obtained boron trichloride and carbon tetraiodide. This compound, when very dry and heated in vacuo to between 90° and 100° C., sublimes very slowly in fine red crystals, having the lustre and transparency of the synthetic rubies of Fremy and Verneuil.

The composition is represented by the formula $C_2I_4$.—Henry Moissan, Chem. News, July 24, 1891, 49, from Comptes rendus, cxiii., 1891, No. 1.

*Carbon Bisulphide—Purification.*—A. Chenevier recommends to add 0.5 c.c. of bromine to a litre of carbon bisulphide, allowing the mixture to stand 3 to 4 hours, and then to remove the bromine by shaking with a small excess of potassa solution or copper turnings. Cloudiness is removed with small quantities of dry chloride of calcium, and subsequent filtering. Peroxide of lead may replace the bromine, but it will be necessary to rectify the bisulphide afterwards.—Zeits. Oester. Apoth. Ver., 1891, 433, from Bull. Soc. Ph. Bord.

*Estimation in Water.*—See *Water.*

*Carbonates.*—See the respective bases.

*Carbonic Acid Water.*—See under *Aqua.*

CYANOGEN COMPOUNDS.

*Hydrocyanic Acid—Detection.*—According to A. Hilger and K. Tamba, hydrocyanic acid, cyanides, etc., are easily detected by adding to the solutions or mixtures tartaric acid, then gradually render them faintly alkaline with sodium carbonate, and distil in a current of carbonic acid gas at a temperature not over 60° C.; the distillate to be tested for hydrocyanic acid. Potassium cyanide and the easily soluble metallic cyanides (excepting mercuric) are decomposed by carbonic acid already in the cold; at 50° to 80° C. all cyanides are decomposed. Cyanides insoluble in water are diffused in water and decomposed by carbonic acid at 100° C. Potassium ferro- and ferricyanides require 80° to 100° C. Prussian blue and copper ferrocyanide are diffused in water and treated at 100° C. Solutions of ferro- and ferricyanides rendered alkaline with carbonate of sodium do not yield hydrocyanic acid on being distilled in a current of carbonic acid.—Zeitschr. analyt. Chemie, 1891, xxx., 529.

*Hydrocyanic Acid—Detection in Blood.*—This test is based on the fact that blood on oxidation loses its red color and turns yellow, while in the presence of hydrocyanic acid the red color brightens. Dilute 1 c.c. of the blood with 99 c.c. of a solution of ferricyanide of potassium (0.1%), added drop by drop, shaking after each addition. Normal blood turns, of course, yellow; if, however, the color turns bright red, the presence of hydrocyanic acid is indicated. This reaction can also be used for the detection of the acid in other liquids. Dilute 1 c.c. with 99 c.c. of water, filter, and shake it with a minute fragment of ferricyanide of potassium until the appearance of the yellow color, and pour on top of the diluted blood a few drops of the liquid to be examined, so as to form a layer—a red color will indicate the presence of the acid. One precaution has to be observed: that neither the blood nor the liquid are alkaline, but either strictly neutral or very faintly acid (methaemoglobin is colored red in

alkaline solution).—Kobert; D. A. Apoth. Zeitg., Aug. 1891, 72; from Apoth. Zeitg., 1891, 386.

*Hydrocyanic Acid—Action on Calomel.*—Cheynet endeavored to determine the cause of the toxicity of a mixture containing both hydrocyanic acid and calomel. Scheele explained the greater toxicity by assuming the formation of mercuric cyanide; this was apparently disproved by Bussy and Buignet, who distilled the mixture, and found in the residue mercuric chloride, and in the distillate hydrocyanic acid. It is now known that hydrocyanic acid displaces hydrochloric acid in diluted solutions, while in concentrated solutions hydrochloric acid displaces hydrocyanic acid. It is also known that in a mixture containing calomel and hydrocyanic acid a certain quantity of mercury is set free, and the liquid becomes decidedly acid. To arrive at some conclusion as to the cause of the acidity the author used tropæolin, which is not acted upon by either substance alone, but on mixing a violet-red color appears, showing the presence of free, strong acid (hydrochloric acid). To obtain the other body formed in the reaction the author added silver carbonate, when the hydrochloric acid was eliminated; after filtration the presence of mercuric cyanide and a trace of silver cyanide was proven.—Am. Journ. Pharm., 1892, 311; from L'Union Pharm., 1892, 153.

*Hydrocyanic Acid—Hydrogen Peroxide as Antidote.*—Kobert recommends, in poisoning with hydrocyanic acid, to wash out the stomach with hydrogen peroxide, and to inject it hypodermatically at the same time until the odor of hydrocyanic acid has disappeared from the breath and dyspnœa and convulsions have ceased.—Drug. Circ., 1891, 276; from Chem. Zeitg., 1891, 1375.

*Mercury and Zinc Cyanide—Correction.*—W. R. Dunstan corrects the conclusions he arrived at in his first communication about this compound (see Proceedings 1890, xxxviii., 538), denying the existence of a double cyanide. The precipitate in question loses a large quantity of mercuric cyanide when it is washed with cold water; some, however, remains attached to the zinc cyanide. Dunstan concluded at first that the retained mercuric cyanide is not chemically combined, but in some manner mechanically entangled by the zinc cyanide. Subsequent experiments, however, disproved this theory. The amount of mercuric cyanide "retained" is dependent on the amount of water present during precipitation, as well as on the proportion in which the salts react. The maximum quantity retained is 38.5 per cent., and is precipitated when cold saturated solutions of the reacting salts are mixed in equi-molecular proportions. The washed precipitate is quite amorphous, and prolonged contact with cold water leads to the gradual removal of mercuric cyanide, which is done more rapidly with boiling water. Dunstan found that the composition is expressed by the formula $Zn_4Hg(CN)_{10}$, that is to say that the compound is

a tetra-zincic mono-mercuric deca-cyanide mixed with more or less zinc cyanide.—Pharm. Journ. Trans., March 1892, 769.

*Potassium Cyanide—Purity of Commercial.*—T. A. Ellwood has examined nine commercial samples with the following results: fused 17.2, 24, 40, 70 and 79 per cent. of pure potassium cyanide, and crystalline, 98, 98.2, 98.4, 98.9 per cent. From which follows that the crystalline salt is much purer than the fused.—Pharm. Jour. and Trans., Nov. 1891, 393.

*Sulphocyanic Acid—Reactions.*—G. Colasanti finds that on adding to a solution of auric chloride (1 : 1000 up to 1 : 10,000) a solution of caustic alkali, and heating it with a very dilute solution of a sulphocyanide, a violet coloration will be produced, and, on cooling, metallic gold separates. If the sulphocyanide solution is not too dilute, the reduction of gold takes place also in the cold.

The reaction of Molisch (for sugar) may also be used for detecting minute quantities of a sulphocyanide. On adding to a dilute solution of the latter a few drops of a 20 per cent. alcoholic solution of alpha-naphthol and then twice as much pure sulphuric acid, there will be observed, first, an emerald-green ring, and, on shaking, a violet coloration. On cooling, white needle-shaped crystals appear, which are colored yellow on being treated with nitric acid, and probably consist of "Martius-yellow." This last reaction may be made use of to detect sulphocyanic acid in urine.—Chem. Zeitg. (Rep.), 1892, 154; from Centralbl. med. Wiss., 1892, 211.

### ALKALIES.

*Alkaline Hydrates and Oxides—Dobbin's Reagent.*—According to R. Kissling, Dobbin's reagent is prepared as follows: A solution of mercuric chloride is gradually added to a solution of about 5 gm. of potassium iodide until a permanent precipitate begins to form. The latter is removed by filtration, and the filtrate mixed with 1 gm. of ammonium chloride, and just sufficient of a weak solution of sodium hydrate until once more a permanent precipitate is produced. Filter and make up to one litre. This reagent forms a yellow coloration on the addition of the smallest trace of an alkaline hydrate.—Yearbook Pharm., 1891, 20, from Zeits. angew. Chem., 1890, 262.

### POTASSIUM.

*Potassium—Quantitative Determination by the Spectroscope.*—F. A. Gooch and T. S. Hart have applied the spectroscope to the quantitative determination of potassium with surprisingly close accuracy. Reference must be had to the original article for the details; here can only be mentioned the substitute for the well-known platinum loop, which they employed, and which made such accurate work possible. They made use of a coil of platinum wire, by winding the wire somewhat obliquely around a rod of suitable size, pressing the coils close together, and gathering the free

ends into a twisted handle. The size of the coils may be regulated to a nicety, and they found that the coils could be made to hold almost exactly any appropriate amount of material. The idea with the coil is due to Truchot (Comptes rendus, lxxxviii., 1022.—Chem. News, 1892, lxv., 22, 32.

*Potassa—Purity of Commercial.*—According to T. A. Ellwood, four samples of commercial potassa contained respectively 62.7, 79, 80.8 and 92 p. c. of KOH.—Pharm. Journ. Trans., Nov. 1891, 393.

*Potassa.*—According to the late Prof. Dittmar, the current idea that gold and silver vessels are unaffected by caustic acid is erroneous; it may be true for soda, but is not for potassa. The reason why the "Kalium hydricum purissimum" of Trommsdorff or Merck is quite white, is that it contains more water than corresponds to the formula KOH. On attempting to dehydrate it by fusion in a silver dish, oxygen is absorbed from the air, and the silver dish is attacked as soon as a certain point is passed; the material cannot therefore at once be anhydrous and pure. The same result obtains by using gold alloyed with ten per cent. of silver. The purest potassa Dittmar was able to prepare contained potassium carbonate and water, as well as traces of gold (0.01 per cent.) sufficient to give it a dark brown color.—Chem. Drug., March 1892, 375.

*Potassa—Presence of Silver.*—Kobbe remarks that almost all the so-called "pure" potassa and soda of commerce reacts with hydrogen sulphide. This, however, is not due to the presence of lead, as Brenstein supposes, but to silver, which contamination probably can not be avoided from the method of preparation.—Pharm. Zeitg., 1892, 177.

*Potassa—Presence of Lead.*—Brenstein thinks that the presence of silver is out of the question, otherwise it would be noticed on supersaturating with hydrochloric acid (in the test for alumina according to Ph. Germ.) He states that not so few of the silver vessels used in the arts and laboratory contain quite a large percentage of lead, which fact will easily account for the presence of lead in fused potassa and soda.—Chem. Zeit., Rep., 1892, 153, from Pharm. Zeitg., 1892, 256.

*Potassium Bichromate—Detection of Chloride.*—In testing for chloride with argentic nitrate, the red color of the argentic chromate is apt to conceal the white color of the chloride. Vulpius recommends therefore to be careful with the addition of argentic nitrate; Schmidt, with the same object in view, proposes to heat the solution of the bichromate (which previously has been strongly acidified with nitric acid) before adding the silver solution, argentic chromate being quite soluble in hot water.—Pharm. Centralh., 1891, 352.

*Potassium Carbonate—Preparation.*—F. W. Dupré has patented a process according to which a solution of sodium carbonate is treated with excess of potassium sulphate.—Chem. Zeitg., 1891, 1586.

*Potassium Iodate—Preparation.*—This salt, which has been recommended by Max Groeger as starting point in volumetric analysis, is best prepared as follows:

The salt is prepared in the following manner—Sublimed iodine is added to a moderately strong, hot solution of potassa (which must be as free from carbonate as possible) until it begins to be tinged by free iodine. The solution is then evaporated to dryness, the mass extracted with alcohol, and the undissolved residue repeatedly crystallized from boiling water until the solution no longer affects delicate litmus paper, and does not become blue when it is mixed with dilute sulphuric acid and gelatinized starch (showing the absence of iodide).

The alcoholic extract can be used for the preparation of iodide of potassium. For this purpose it is evaporated, the residue dissolved in water, enough iodine added to produce a decided yellow color, and hydrosulphuric acid passed through to destroy the iodate. The solution is then filtered, evaporated to the point of crystallization, and the product purified by repeated crystallization.—Am. Drug., July 1891, 224, from Zeit. angew. Chem., 1890, 385.

*Potassium Iodide—Detection of Iodates.*—T. Gigli dissolves 4 to 5 gm. of potassium iodide in 300 c.c. of distilled water, adds 20 c.c. of diluted sulphuric acid (2 per cent.), and titrates the liberated iodine with decinormal sodium thiosulphate and starch. One molecule of the thiosulphate corresponds with 1 atom of iodine, and hence with 1/6 mol. of $KIO_3$.—Journ. Chem. Soc., 1892, lxi., 657; from l'Orosi, xiv., 229–232.

*Potassium Iodide—Detection of Potassium Bromide.*—This method is based on the insolubility of bromide of mercury in boiling alcohol. The potassium salt is dissolved and carefully precipitated with mercuric chloride; the precipitate is then exhaused with boiling alcohol, which will leave the bromide, if present.—Am. Journ. Pharm., 1891, 558; from Bull. Thérap., 1891, 93.

*Potassium Mercuric Thiosulphates.*—A. Fock and K. Kluess describe $5K_2S_2O_3.3HgS_2O_3$, $3K_2S_2O_3.HgS_2O_3+3H_2O$, and $K_2S_2O_3.Hg(CN)_2+H_2O$.—Journ. Chem. Soc., Aug. 1891, 879; from Ber., xxiv., 1351–1355.

*Potassium Nitrate.*—F. Hoffmann gives an interesting account of the great saltpetre caves found in the United States, notably of Virginia and Kentucky.—Pharm. Rundschau, N. Y., 1891, 185.

*Potassium Persulphate by Electrolysis from the Sulphate and Bisulphate.*—H. Marshall.—Journ. Chem. Soc., Sept. 1891, 982.

*Potassium Cyanide.* See *Cyanogen Compounds.*

*Potassa Sulphurata.* See under *Sulphur.*

*Potassium Myronate.* See under *Myronic Acid.*

*Potassium Bitartrate.* See under *Wines* and under *Acidimetry.*

## SODIUM.

*Sodium—Keeping.*—W. Vaubel proposes, in view of the danger which attends the keeping of sodium in petroleum, to keep the metal in liquid paraffin.—Pharm. Zeitg., 1892, 233.

*Soda.*—Richard Meyer gives a historical review of the different processes proposed, and worked on the large scale from 1793 to the present time, for which see Pharm. Centralhalle, 1891, 422–425, from Naturw. Rundschau.

*Soda—History.*—James S. Stevenson has written a comprehensive history of soda from the earliest times down to the present, which will be found in Drug. Circ., 1892, 5.

*Soda—New Process.*—Haddock and Leith have patented a process, which is the Leblanc, Solvay and Chance processes rolled into one. It gives the chlorine of the first, takes advantage of the carbonating of the second (without the ammonia), and it advances Chance's idea to being not only a waste-recovering, but an alkali producing process. Chance applies carbonic acid to calcium sulphydrate, H. and L. apply it to the sodium salt. Their process purposes to recover the sulphur from the Leblanc vat waste; but instead of combining therewith the manufacture of ammonia soda, it aims at simultaneously converting "salt cake" into carbonate of soda, of a strength and purity equal to ammonia soda, by a wet method of decomposition, and without the use of ammonia. This process is an exceedingly ingenious one, conducted in four stages. The first stage is the manufacture of calcium sulphydrate, which is done by passing sulphuretted hydrogen through an emulsion of Leblanc vat waste. After this is fully charged and allowed to settle, the clear liquor is mixed with a saturated solution of salt cake. The result is that the sodium sulphate and the calcium sulphydrate interact, calcium sulphate being precipitated and sodium sulphydrate remaining in solution. But 4 per cent. of calcium sulphate remains in solution and is precipitated as carbonate in the third stage. The fourth and final stage, apart from evaporation, consists in the carbonation of the sodium sulphydrate solution, an operation performed by passing it through a tower into which lime-kiln gas (chiefly carbonic gas) is forced. Sodium bicarbonate is formed, three-fourths of it crystallizing out; sulphuretted hydrogen is given off, and is collected and utilized as such in the first stage, or is converted into sulphur or sulphuric acid. The mother liquor yields a crop of crystals on evaporation, and the liquor from that is used for neutralization purposes in the course of the process.—Am. Drug., July 1891, 222, from Chem. and Druggist.

*Soda—By Electrolysis.*—A process which is capable of bringing about a complete revolution in the manufacture of soda and chlorine, has been exhibited lately by Greenwood. The material operated upon is a solution of sodium chloride flowing through a series of decomposing cells, in which

it is subject to the influence of an electric current. The cathode is an iron plate, and the anode is formed of carbon plates with a metal core. Between the two is a screen, formed of strips of slate like a Venetian blind, and packed with asbestos. The object of this peculiar construction of the anodes is to facilitate the collection of the chlorine gas, while the sodium by a secondary action is converted into soda, which accumulates in the salt solution. The whole operation is conducted in an automatic manner, and the decomposition of the sodium chloride is stated to be at least 75 per cent. of the material operated upon. As the *chlorine* is evolved, it is led away through tubes to an absorption vessel containing milk of lime. The entire cost of the power requisite for decomposing one ton sodium chloride is (for England) only £3 7s. 8d.—Pharm. Jour. and Trans., Jan. 1892, 561.

*Sodium Nitrite—Assay.*—G. Lunge assays nitrites by adding the solution to a previously measured and warmed semi-normal solution of potassium permanganate strongly acidulated with sulphuric acid. If the permanganate, however, were added to the solution of the nitrite, some of the nitrous compounds would not be oxidized by the permanganate, and be lost. In the case of easily soluble nitrites, it is only necessary to make an aqueous solution of known strength. Difficultly soluble nitrites, for instance silver nitrite, it is best to dissolve in sulphuric acid, when, of course, it is not necessary to add acid to the permanganate solution.—Am. Drug., 1892, 12, from Zeits. angew. Chem., 1891.

*Ammonia—Soda Process—Utilization of the Liquor.*—In 1876, Thorwald Schmidt proposed to decompose the liquor, containing the chlorides of sodium and calcium, by a solution of the ashes of seaweed, by which hydrated sulphate of calcium and hydrated magnesia are precipitated in a form which may be made available for paper making, as "pearl hardening." H. Schreib proposes now to use sulphuric acid or acid sulphate of sodium as being more available, and at the same time furnishing hydrochloric acid. "Pearl hardening" serves a useful purpose as paint for cardboard, since all printing matters may be lithographically printed directly upon the painted cardboard.—Chem. News, July 3, 1891, 4.

*Sodium Chloride—Use.*—This is certainly a very innocent remedy for insect bites. It has been recommended to rub the moistened place well with salt.—D. A. Apoth. Zeitg., Aug. 1891, 81.

*Sodium Chloride—Estimation in Wines.* See under *Wines.*

*Sodium Sulphoricinolate.* See under *Oleic Acid.*

*Chlorinated Soda.* See under *Liquor.*

*Sodium Arseniate.* See under *Arsenic.*

*Sodium Hypobromite.* See under *Bromine.*

*Sodium Benzoate.* See under *Benzoic acid.*

*Sodium Thiophenosulphonate.* See under *Thiophene.*

*Sodium Tellurate.* See under *Tellurium.*

*Sodium Salicylate.* See under *Salicylic Acid.*

*Sodium Sulphide.* See under *Sulphur.*

## AMMONIUM.

*Ammonia.*—According to most pharmacopœias, carbonic acid is tested for with lime water, on mixing ammonia with which turbidity will indicate carbonic acid. Hertkorn points out that when the carbonic acid is present, as carbaminate of ammonium, this test will fail; on boiling, however, the turbidity will appear. He proposes, therefore, to alter the pharmacopœial test as follows: A mixture of equal parts of ammonia and lime water should not become turbid on boiling.—Chem. Zeitg., 1891, 1493.

*Ammonia—Test.*—The well-known test for ammonia—exposing a glass rod dipped into hydrochloric acid to the fumes—is rendered more sensitive, according to Eber, by using a mixture of 1 part of ether, 3 parts of alcohol, and 1 part of hydrochloric acid. A few c.c. of this liquid are well shaken in a test tube, and a glass rod, with a couple of drops of the liquid, introduced into the tube, close to, but not touching, the acid mixture.—Phar. Centralh., 1892, 238.

*Ammonia—Nessler's Test.*—Hazen and Clark call attention to the fact, often overlooked, that the color produced by Nessler's test depends on the temperature, being much darker with increased temperature. It will, therefore, be necessary to bring all the solutions and liquids used to the same temperature.—Chem. Zeitg., 1891, 1888.

*Ammonia—Solubility in Alcohol.*—Delepine has investigated the solubility of ammonia ($NH_3$) in alcohol of various strengths and at different temperatures. The following table gives the weight of ammonia in one liter, the specific gravity, and the coefficient of solubility:

STRENGTH OF ALCOHOL.

| Temperature. | | 100 p. c. | 96 p. c. | 90 p. c. | 80 p. c. | 70 p. c. | 60 p. c. | 50 p. c. |
|---|---|---|---|---|---|---|---|---|
| Melting ice | Weight | 130.5 | 146 | 173 | 206.5 | ...... | 246 | 304.5 |
| | Spec. grav. | 0.782 | 0.783 | 0.800 | 0.808 | ...... | 0.830 | 0.835 |
| | Coefficient. | 209.5 | 245 | 302.5 | 390 | ...... | 504.5 | 697.7 |
| 10° C. | Weight | 108.5 | 120 | 137.5 | 167 | ...... | 198.25 | 227 |
| | Spec. grav. | 0.787 | 0.803 | 0.794 | 0.800 | ...... | 0.831 | 0.850 |
| | Coefficient. | 164.3 | 186 | 234.4 | 288 | ...... | 373 | 438.6 |
| 20° C. | Weight | 75 | 97.5 | 102 | 119.75 | 137.5 | 152.5 | 182.7 |
| | Spec. grav. | 0.791 | 0.788 | 0.705 | 0.821 | 0.829 | 0.842 | 0.869 |
| | Coefficient. | 106.6 | 147.8 | 158.3 | 190.5 | 223 | 260.8 | 338.2 |
| 30° C. | Weight | 51.5 | 74 | 77 | 81.75 | 100.3 | 129.5 | 152 |
| | Spec. grav. | 0.798 | 0.791 | 0.796 | 0.826 | ...... | 0.846 | 0.883 |
| | Coefficient. | 97 | 106.7 | 114 | 121.6 | ...... | 211.6 | 252 |

—Chem. Zeitg., Rep., 1892, 101; from Journ. Pharm. Chim., 1892, xxv., 496.

*Ammonium Nitrate—Preparation.*—C. A. Burghardt has patented a new method of preparing this salt, which consists in mixing equivalent proportions of nitrate of lead and ammonia or ammonium carbonate in solutions. The filtrate can be freed from any remaining traces of lead by the addition of a little ammonium carbonate, and then evaporated, etc.—Chem. Zeitg., 1891, 1320.

*Ammonium Nitrite—Catalytic Decomposition.*—O. Loew has observed that the addition of platinum black to a weak solution of ammonium nitrite causes the immediate evolution of a gas, which at the beginning of the process consists of a mixture of nitrogen and nitrous oxide, but subsequently of pure nitrogen only.—Yearbook Pharm., 1891, 21, from Ber., xxiii., 3018.

*Ammonium Sulphide—Preparation.*—Instead of the usual method of saturating solution of ammonia with hydrogen sulphide, E. Donath recommends, when only small quantities of this reagent are required, to place one part powdered ammonium chloride in a retort connected with a good condenser, to add a solution of two parts of crystallized sodium sulphide in five parts boiling water and distil off about one-half of the liquid in the retort; the distillate represents a very concentrated and trustworthy reagent.—Am. Journ. Pharm., 1891, 460, from Chem. Zeitg., 1891, 1021.

## LITHIUM.

*Lithium Citrate—Solubility.*—W. A. Puckner found that the solubility of lithium citrate in water, as stated by the U. S. Ph. (5.5 parts of water at 15° C.) is not correct. Puckner states that at 15° C. only 2.37 parts of water are necessary.—Am. Drug., 1892, 65.

*Lithium Carbonate, Effervescent.*—See under *Salia.*

*Lithium—Double Chloride with Copper.*—Chassevant remarks upon a double chloride of copper and lithium, $2CuCl\ LiCl + 5H_2O$, the grenat-colored crystals of which are readily decomposed by water, forming ultimately masses of fine green needles of copper chloride, the lithium chloride separating as a colorless syrup.—Pharm. Journ. Trans., Nov. 1891, 427, from Comptes rend., 1891, cxiii, 646.

*Lithium Nitride.*—By heating lithium in a current of nitrogen gas, Ouvrard has obtained a product containing 38 to 56 per cent. of nitrogen, from which he draws the conclusion that the compound may be represented by the formula $Li_3N$, or ammonia in which the hydrogen is replaced by lithium atom for atom.—Am. Drug., 1892, 103, from Comptes rendus, cxiv., 120.

*Lithium Zirconate—Preparation.*—L. Ouvrard obtains it by fusing lithium chloride with zirconina; he assigns to it the formula $LiOZrO_2$.—Comptes rendus, cxii., No. 25, through Chem. News, July 10, 1891, 26.

RUBIDIUM.

*Rubidium Barium Dithionate—Formation.*—This double salt was obtained by G. Bodlaender while preparing rubidium dithionate from the sulphate and barium dithionate. The crystals are doubly refracting, and they are more soluble in warm than in cold water, and form readily supersaturated solutions. The composition is $(S_2O_6)_2BaRb_2H_2O$.—Jour. Chem. Soc., 1891, 802; from Chem. Zeitg., xiv., 1140.

BARIUM.

*Barium—By Electrolysis.*—Neither from pure barium chloride nor from a mixture of barium and sodium chlorides did C. Limb succeed in obtaining at the cathode even the smallest quantity of the metal. Chlorine, however, was evolved in abundance, and there is probably formed a barium or sodium sub-chloride, or possibly a combination of both.—Comptes rendus, cxii., 1891, No. 25; through Chem. News, July 10, 1891, 25.

*Barium—Estimation as Sulphate.*—F. W. Mar finds that in precipitating barium by means of sulphuric acid it is highly advantageous to have the solution strongly acidified with hydrochloric acid, as the precipitate is then formed in a more or less crystalline condition, settles rapidly, and can safely be filtered with or without pressure in ten minutes. It is not necessary to add the reagents drop by drop, but the whole quantity required to complete the reaction may be added at once. According to the quantities present the precipitation takes place at once or after a couple of hours.—Jour. Chem. Soc., Sept. 1891, 1137; from Am. J. Sci., (3,) xli., 288–295.

*Barium Persulphate.*—Berthelot states that the composition $(S_2O_8Ba)$ may be regarded as absolutely determined. This salt is soluble and neutral like barium permanganate, and may be separated by filtration from the accompanying barium sulphate. It is slowly decomposed in the cold into insoluble barium sulphate which is precipitated, oxygen which escapes, and sulphuric acid which remains free.—Comptes rendus, cxii., No. 26; through Chem. News, July 17, 1891, 37.

*Barium Salts—Toxicity.*—Dr. Bardet concludes from his experiments on rabbits with barium chloride that barium salts are not as poisonous as has been believed, and that the presence of traces in strontium salts would not make the latter poisonous.—Am. Jour. Pharm., 1892, 192, from Rép. de Pharm., 1892, 35.

CALCIUM.

*Calcium Oxalate—Physiological Importance in Plants.*—Kohl shares with Palladin the theory that this salt is eliminated as an accessory during the synthesis of proteids from amides and carbohydrates. If this be true, oxalates should be found in all plants. Amongst fungi forming oxalic acid in large quantities the author notes *Saccharomyces Hansenii, the oxalic*

*acid ferment* of Kopf. But if the formation of oxalic acid by this and other fungi, and that of acetic acid by the schizophytæ, are regarded as fermentations, why should not the idea be enlarged to cover the formation of tartaric or malic acids, etc., in the higher plants? The author expands this idea, and suggests that the lower plants be given by preference molecular fermentations resulting in the production of alcohol, lactic, and butyric acids, etc., whilst fermentations of oxidation resulting in carbonic, malic, and tartaric acids prevail amongst the higher plants.—Journ. Chem. Soc., July, 1891, 857, from Ann. Agron., xvii., 90.

*Crystalline Monocalcium Phosphate.*—Neither the crystalline nor the honey-like commercial variety of monocalcium phosphate corresponds with the formula $CaH_4(PO_4)_2$, owing to the action of the free sulphuric acid in the crude liquor on the phosphate during evaporation. G. Pointet prepares it by leaving tricalcium phosphate in contact with a solution of the honey-like variety for some time, when on gentle evaporation crystals of pure monocalcium phosphate are obtained.—Journ. Chem. Soc., 1891, 1421, from Bull. Soc. Chim., 1891, v., 254.

*Calcium Sulphate—Plaster of Paris Formulas.*—1. *To Make Plaster Set Hard.*—Mix best plaster of Paris with about 10 per cent.—more or less, according to the effect ascertained by preliminary experiment—of very finely powdered marble (calcium carbonate). Or add to it about 6 per cent. of powdered alum, or about the same amount of ammonium chloride, before mixing it with water.

2. *To Make Plaster Set Slower.*—Mix it with 2 to 4 per cent. of powdered althæa root before adding the water. This not only retards the hardening of the plaster, but also enables it to be cut, filed, sawed and turned.

An addition of 8 per cent. of althæa powder retards the complete setting of the plaster for about one hour, so that the mass can be used for any purpose where it is to remain plastic during at least a portion of that time. —Am. Drug., 1891, 321.

*Plaster Casts—To Harden.*—Dennstedt hardens plaster casts by soaking them in a dialyzed 5 per cent. solution of silicic acid (waterglass?), which has been concentrated by boiling to 15 per cent. The air-dried casts are dipped for a short time in a hot saturated solution of baryta (60–70° C.), rinsed with lukewarm water, and dried at a gentle heat.—Pharm. Post, 1891, 1078.

*Calcium Salicylate.*—See under *Salicylic Acid.*

## STRONTIUM.

*Strontium—Preparation of Pure Salts.*—Barthe and Falieres find that the following method permits the preparation of pure strontium salts with comparative ease, and has the advantages that no heat is necessary, and that the chemicals employed need not be pure.

Dissolve natural strontium carbonate (or the sulphide, obtained by reduction of the sulphate) in just sufficient dilute hydrochloric acid (1 : 5); it will be of advantage that some of the carbonate or sulphide remains undissolved. The clear liquid, which contains calcium, barium and strontium salts, besides small quantities of iron, alumina and magnesia, is decanted from the deposit, and a small excess of ammonia added, which precipitates iron and alumina. To the filtrate is added an excess of sulphuric acid; the precipitate,. consisting of the sulphates of strontium, barium and calcium, is washed repeatedly by decantation with water containing 1 to 2 per cent. of sulphuric acid, and finally with distilled water: this will remove all traces of magnesia and calcium sulphate. The precipitate is next treated in the cold with an excess of a solution of ammonium or potassium carbonate (1 : 10), stirring frequently for two days, and finally washing with distilled water by decantation. The mixture of carbonate and sulphate is treated with diluted hydrochloric acid, which dissolves strontium carbonate and traces of baryta. After allowing to stand for twenty-four hours, the clear liquid is decanted and filtered through a filter, previously washed with diluted hydrochloric acid. To the perfectly clear filtrate is added 200 gm. of hydrochloric acid (1.17) per litre, and then 2 to 3 gm. of precipitated strontium sulphate, which may contain barium sulphate; stirring frequently for several hours. The strongly acid liquid dissolves a little strontium sulphate (about 0.25 per cent.), but in proportion as the strontium is dissolved, the barium takes hold of the sulphuric acid, while an equivalent quantity of strontium chloride is formed. The strontium sulphate being in excess, will insure the final elimination of all the barium. The filtrate is evaporated to dryness, the salt dissolved in three times its weight of distilled water, allowed to stand for twenty-four hours, filtered, evaporated to crystallization, and dried. The crystals showed in the spectroscope only the lines of strontium.—Chem. Zeitg., Rep., 1892, 68, from Bull. Soc. Chim., 1892, 104.

*Strontium Salts—Purity.*—Patein proposes the following reaction for testing the purity of strontium salts, which are being used for diabetes: (1) To a saturated solution of the salt add two or three drops of a solution of potassium bichromate, when the solution should remain clear for at least 24 hours; 0.01 gm. of BaCl in 10 cgm., causes a precipitate. (2) To a very dilute solution of the salt add two or three drops of neutral chromate of potassium (yellow), the liquid should remain clear for several minutes. In order to purify strontium salts, Patein proposes adding a few drops of dilute sulphuric acid (10 per cent.) to a saturated solution of the salt to be purified.—Am. Jour. Pharm., 1892, 136, from Revue Thérap., 1892, 13.

*Strontium Salts—Detection of Barium Salts.*—Jungfleisch recommends Luedeking's test: Addition of a few drops of a saturated solution of potassium chromate (yellow) and of acetic acid, and heating; in the presence

of barium salts a precipitate of barium chromate will make its appearance within a few minutes.—Am. Jour. Pharm., 1892, 313, from Jour. Pharm. Chim., 1892. (Compare Proceedings 1883, xxxi., 195, and 1891, xxxix., 506—Reporter.)

*Strontium Salts—Removal of Baryta.*—Adrian and Bougarel propose to free strontium salts from baryta by means of calcium sulphate, which will first precipitate the baryta before it attacks the strontium. The excess of lime is easily removed by repeated recrystallization.—Chem. Zeitg., 1892, 461, from Bull. Soc. Chim.

*Strontium—Quantitative Separation from Calcium by Fusel Oil.*—P. E. Browning makes use of the almost absolute insolubility of strontium nitrate in amyl alcohol, as contrasted with the solubility of calcium nitrate, to separate these two quantitatively.—Chem. News, 1892, lxv., 271, 282.

*Strontium Salts—Medicinal Uses.*—Ferré states that he has obtained with the bromide as good results as with the alkaline bromides in epilepsy, and that it appeared to be borne better by the stomach. Germain Sée confirmed this statement. Paul states, supported by Dujardin-Beaumetz, that the lactate promptly reduced the albumen in the urine by one-half.—Pharm. Journ. Trans., Nov. 1891, 426, from Rev. Thérapeut., 1891, 592, 604.

*Strontium Salts as Tænifuges*—Dr. Laborde uses a solution of strontium lactate 20 gm., in water 120 gm. and glycerin 30 gm. A tablespoonful twice a day for five days.—Am. Journ. Pharm , 1892, 192, from Rép. de Pharm., 1892, 85.

*Strontium Bromide.*—J. Casthelaz prepares this salt by adding a solution of 100 parts of ammonium bromide and 2 parts of ammonium sulphate to a solution of 150 parts of hydrate of strontium oxide, and boil until all the ammonia has been dissipated. (The sulphate is added to eliminate any baryta which might be present.) The solution must be tested for ammonia and for baryta, in which case the suitable salt must be added. Strontium bromide prepared in this way must be chemically pure. It crystallizes in needle-shaped crystals, containing 6 mol. of water.—Pharm. Post, 1891, 1130, from Rép. Pharm., 1891, 549.

*Strontium Lactate—Preparation.*—Albert Thumann gives the following directions for preparing pure lactate of strontium from the nitrate as ordinarily found in the shops. The nitrate is generally contaminated with about 5 to 6 per cent. of calcium and barium salts; the alumina and iron present are easily got rid of, and alkaline salts, which at times are present, will be got rid of in the process of purifying from the two above-mentioned salts. The separation of calcium depends on the solubility of the nitrate in alcohol, nitrate of strontium being insoluble in alcohol; the separation of barium depends on the relatively greater insolubility of its sulphate as compared to that of the strontium sulphate.

A certain quantity of finely-powdered strontium nitrate is thoroughly washed out on a funnel, closed with absorbent cotton, with strong alcohol; after drying, 44.84 gm. of the nitrate of strontium are dissolved in 1 litre of water and 10 gm. of dilute sulphuric acid added, when all the barium present will be precipitated, together with a small quantity of strontium. The filtrate is treated with an excess of pure sodium carbonate (about 60 gm. dissolved in 1 litre of water); the precipitated strontium carbonate is washed on a filter to free it from soda and sodium nitrate. To the strontium carbonate, contained in a tared beaker, are added 36 gm. of absolute lactic acid diluted with 200 c.c. of water, and the mixture heated until solution; then sufficient water is added to make the solution weigh 551 gm., which will then represent 10 per cent. of pure, anhydrous strontium lactate.

As test for its purity Thumann precipitates the solution with sufficient ammonium carbonate, dissolves the precipitate in hydrochloric acid, and evaporates to dryness on a water-bath. On treating the dry salt with absolute alcohol, the chlorides of calcium (if any) and strontium are dissolved, while the insoluble chloride of barium (if any) remains behind, and can then be identified by the flame reaction. The alcoholic solution is then evaporated to dryness, and the residue dissolved in nitric acid, evaporated again and treated with absolute alcohol, which will dissolve any calcium nitrate present; this can easily be identified by ammonium oxalate.—Jour. Pharm. Elsass-Lothr., 1892, 84.

## MAGNESIUM.

*Magnesium—Reduces Oxygen Compounds of the Fourth Group*, for which see the respective metals.

*Magnesia—Light Calcined.*—C. Spaeter has patented a new method for obtaining light calcined magnesia. The ordinary kind is mixed with sufficient sodium bicarbonate that the loosely combined carbonic acid will convert the magnesia into the neutral carbonate. The powder is now moistened with about six or eight times as much water (by weight) to form a rather stiff dough of the carbonates of sodium and magnesium, and avoid the formation of a double salt. After washing out the sodium salt, the remainder is calcined as usual.—Chem. Zeitg., 1892, 81.

*Magnesium Peroxide—Preparation.*—Place calcined magnesia (5 parts) in contact with a 3-volume peroxide of hydrogen (100 parts) at the ordinary temperature, and allow them to react for some time (the original says "from several hours to several days"). Then filter, wash the contents of the filter, and dry at 100° to 105° C.

On assaying the product with permanganate of potassium, it will be found to have the composition $3Mg(OH)_2.MgO(OH)_2$. This compound loses its active oxygen at a temperature of about 300° C.—Am. Drug., Aug. 1891, 230, from Compt. rend., ccxii., 1374.

*Magnesium and Lead Iodide—Double Salt.*—Otto and Drewes describe a double iodide corresponding to the chlorine salt $PbCl_2,2MgCl_2+13H_2O$, recently prepared by them. To a hot saturated solution of magnesium iodide so much dry lead iodide as will dissolve is added, the solution filtered and allowed to cool. The yellowish crystals gave analytical results corresponding to the following formula: $PbI_2,2MgI_2+16H_2O$. It loses its water of crystallization at 140° C., decomposes with elimination of iodine at 150° C., and is so hygroscopic that it deliquesces in the air to a solution of magnesium iodide in which lead iodide is mechanically suspended.—Pharm. Jour. and Trans., Aug. 1, 1891, 86; from Archiv der Pharm., May 25, 179.

*Magnesium acetate*, see under *Acetic acid.*

*Magnesium ichthyolate*, see under *Ichthyol.*

*Magnesium borocitrate*, see under *Citric acid.*

## ALUMINIUM.

*Aluminium.*—A very sober view of the intrinsic value of aluminium to the arts and sciences will be found in Popular Science News, July, 1891 and in Pharm. Jour. and Trans., July 1891, 48.

*Aluminium—History.*—F. Foerster has given a short resumé of the history of the production of aluminium from the time of Woehler, in 1827, to the present time, which the readers may consult in Pharm. Centralhalle, 1891, 652–654; from Naturw. Rundschau.

*Aluminium—Real Usefulness.*—A. Luebbert and Roscher have thoroughly investigated the claims of the wide applicability and innocuousness of aluminium, and found that its usefulness is very circumscribed. Aluminium causes a slow evolution of hydrogen in boiling water, is easily attacked by alkalies, and precipitates many metals from their alkaline solutions. The authors exposed aluminium foil to the action of several solutions at ordinary temperature for four days with the following results:

Acetic, butyric, caprylic, citric, formic, lactic, malic, malonic, oleic, oxalic, palmitic, propionic, stearic, succinic, tannic, tartaric, trichloracetic and valerianic acids, in 5 and 10 per cent. solutions, dissolve the metal in the cold, and several of the acids also in 1 per cent. solution. Methylamin, propylamin, trimethylamin, red wine, white wine, bile (1, 5, 10 per cent.) herring pickle, coffee and tea, attack and dissolve it. The usual antiseptics: mercuric chloride, salicylic acid, carbolic acid, boric acid and iodoform, in the commonly employed strengths, attack it quite readily, as also does soap. According to the above facts, which can easily be verified, aluminium is not at all safe to use in the laboratory or kitchen, —Phar. Centralhalle, 1891, 545–550.

——— G. Rupp points out that the results of Luebbert and Roscher are invalidated by the fact that they used aluminium foil, which in several

respects possesses properties different from those of solid aluminium. For instance, the foil oxidizes in boiling water with evolution of hydrogen, whilst the solid aluminium is not altered. Rupp subjected several aluminium containers (goblets, canteens, etc.,) to contact for a couple of weeks with wine, beer, brandy, coffee, tea, milk, jams, etc., and also solutions containing 1 per cent of tannic acid, 10 per cent. of acetic acid, and 5 per cent. of several acids. The amount of aluminium dissolved was found to be so insignificant as to establish the innocuousness of aluminium under ordinary circumstances. Even finely rasped aluminium was scarcely attacked by a 10 per cent. solution of acetic acid. Of course, alkaline liquids must not be brought in contact with aluminium.—Chem. Zeitg., 1892 (Rep.), 21; from Dingler polyt. Journal, 1892, 19.

——— G. Lunge and E. Schmid arrive at the same conclusion as Rupp, that for all ordinary purposes aluminium is perfectly safe, provided that it is borne in mind, that aluminium must not be exposed to alkali nor to nitric acid.—Chem. Zeitg., 1892 (Rep.), 38; from Zeits. angew. Chem., 1892, 7.

*Aluminium—Solder.*—According to the patent of F. Page and H. A. Anderson, silver chloride is used as flux, and the solder applied as usual.—Chem. Zeitg., 1891, 851.

*Aluminium—Curious Behavior Towards Mercury.*—Helbig states that when a little mercuric chloride is placed upon a piece of metallic aluminium, white, hair-like formations will at once be seen to rise from the surface. These grow during a short time considerably (several centimeters during fifteen minutes). To succeed, the aluminium must be tolerably clean. First an aluminium amalgam is formed; next the aluminium dissolved by the mercury is oxidized by the air and converted into alumina.—Am. Drug., 1892, 135; from Pharm. Centralh.

*Aluminium—Action of Carbonic Acid.*—N. Wender found that neither dry nor moist carbonic acid acts upon aluminium; even prolonged contact with carbonic acid water had no appreciable action.—Chem. Zeitg., Rep., 1892, 69; from Pharm. Post, 1892, 201.

*Alum—Detection in Bread.*—Cohen triturates the bread with water until disintegrated, and places in this mixture a piece of pure gelatin, which he allows to remain for twenty-four hours. It is then washed with cold water containing a few drops of tincture of hæmatoxylon (1 : 10) and of a solution of carbonate of ammonium (1 : 10). Should the gelatin after this treatment assume a blue color, alum was present.—Am. Journ. Pharm., 1891, 558; from Bull. Therap., 1891, 281.

*Alumina—Estimation in Bread.*—W. C. Young states that by Dupre's method (precipitating the alumina as phosphate from an acid solution containing ammonium chloride and acetate, and collecting after remaining all night in the cold) the results are much below the truth. The best results

are obtained by boiling the mixture both before and after the addition of ammonium acetate, and filtering immediately. The best proportions are for 0.1 gm. of potash alum, 1 gm. of ammonium acetate, and 5 c.c. of ordinary acetic acid. The presence of ammonium chloride has little effect when the liquid is filtered immediately after boiling, but lowers the result if the precipitation is performed in the cold.—Yearbook Pharm., 1891, 135; from Analyst, xv., 61, 83.

(Compare also Proceedings 1891, xxxix., 509.)

*Aluminium Sulphate—Containing Arsenic.*—Kratschmer calls attention to the presence of arsenic in several of the commercial sulphates of aluminium.—Zeits. Oesterr. Apoth.-Ver., 1891, 723.

*Clay—Test for Iron.*—E. Nickel communicates a very handy way of proving the presence of iron in clay, sand, and porous earthenware. On moistening the clay with a fresh mixture of a solution of potassium ferrocyanide and hydrochloric acid, the spot will immediately be stained blue. On adding the acid to the ferrocyanide, care must, of course, be taken not to precipitate ferrocyanide of potassium.—Chem. Zeitg., 1891, 1125.

*Cryolite—Preparation of Artificial.*—A. v. Asbóth fuses together sodium chloride, aluminium fluoride and zinc, and heats strongly for 15 minutes; or, adds aluminium fluoride to molten sodium chloride, and fuses until the evolution of the chlorine ceases. The product is a pink, insoluble, amorphous powder, containing cryolite to the amount of 46.88 per cent. by the first, and 42.52 per cent. by the second method. The powder at a high temperature approaching fusion, becomes granular and white.—Journ, Chem. Soc., July 1891, 806, from Chem. Zeitg., xiv., 868.

## BERYLLIUM.

*Beryllium—Atomic Weight.*—G. Kruess and H. Morath consider Be = 9.027 (O = 15.96), to be the most correct atomic value.—Journ. Chem. Soc., Aug. 1891, 881, from Annalen, cclxii., 38–61.

## CERIUM.

*Cerium—Action of Magnesium.*—Cerium is reduced at high temperatures by magnesium either to cerium or the sesquioxide. Cerium monoxide and magnesium ceride do not appear to exist. When the reduction takes place in hydrogen, the latter is rapidly absorbed, and *Cerium hydride*, $CeH_2$, is formed. Cerium hydride is inflammable, is brownish-red and decomposed by acids.—C. Winkler, Journ. Chem. Soc., July, 1891, 802, from Ber., xxiv., 873.

*Cerium Group.*—For researches on the metals of the cerium group, respecting the preparation of pure compounds, etc., by P. Schottlaender, see Chem. News, 1892, lxv., 205, 219, 238, 255, from Ber., 1892.

*Cerium—Test.*—P. C. Plugge reverses the test of Sonnenschein for

strychnine (ceroso-ceric oxide)—see also Proceedings 1886, xxxiv., 608—and renders it more sensitive, claiming to be able to detect 0.0001 gm. He proceeds as follows: Evaporate a small quantity of the solution of cerium salt in a porcelain dish to dryness under careful addition of sufficient of a 10 per cent. solution of soda to make it distinctly alkaline, then add a few drops of a solution of 1 part of strychnine sulphate in 1000 parts of concentrated sulphuric acid, when a blue coloration appears, which gives way to a cherry-red or light pink color.—Archiv d. Pharm., 1891, 229, 558.

### ERBIUM AND DIDYMIUM.

*Erbium and Didymium—Chemistry.*—At present we understand by the names erbium and didymium different bodies from those which were so called in the years 1870 to 1880.

*Erbia,* which twenty years ago was regarded as the oxide of an individual earth, consists of at least seven distinct earths: scandia, ytterbia, thulia, erbia, terbia, Soret's "X," and yttria. A few years ago "X" (or Cleve's holmium), by fractionated percipitation and the spectroscopic examination of the several fractions, was shown to consist of at least two elements; and yttria is stated not to be the oxide of a chemical individual.

*Didymium* has like wisebeen broken up: first into $D\beta$ (Brauner's "Z") or samarium and true didymium; and the latter again consists of at least two distinct elements, neodymium and praseodymium. And now we learn that both of the latter are compound bodies. Hence, up to the present date, we have not succeeded in completely isolating any one constituent of the rare earths, and characterizing it with certainty as an element. Gernard Kruess has investigated these two earths anew, and comes to the conclusion that the very slightly differing basicity of these earths, and the solubilities of their salts, which are almost alike, impede in the highest degree the solution of this problem. It is also questionable whether many of the rare elements actually possess the atomic weights which have hitherto been attributed to them.—Chem. News, 1891, lxiv., 65, 75, 100, 120.

### SAMARIUM.

*Samarium—Properties.*—A. Bettendorff.—Jour. Chem. Soc., Sept. 1891, 984; from Annalen.

### LANTHANUM.

*Lanthanum—Atomic Weight.*—According to B. Brauner, lanthanum is probably a trivalent metal with an atomic weight of 138.21 (O=16), which number is identical with the results of Cleve and of Bettendorff. Winkler describes it as quadrivalent with an atomic weight of 180; but then its atomic heat would be 8.07, which would make it unique in its variation from the law of Dulong and Petit. From its position between

cerium and thorium and ytterbium and tantalum, the molecular volume of the oxide should not exceed 26; with the higher atomic weight, the molecular volume is 33; with the lower, 25.0. Lanthanum is the most positive metal of the rare earths; an element occurring between those above mentioned and forming an oxide $RO_2$, should exhibit only feebly basic properties. The material was obtained from impure lanthanum oxide by fractionate exhaustion with ammonium nitrate. It was totally free from didymium.—Journ. Chem. Soc., 1891, 881, from Ber. xxiv., 1328–1331.

*Lanthanum—Action of Magnesium.*—Lanthanum behaves in the same way as cerium, which points to its being a quadrivalent element, and to having a position in the natural system of elements different from that usually assigned to it.—C. Winkler, Journ. Chem. Soc., 1891, 802, from Ber., xxiv., 873.

## THORIUM.

*Thorium—Action of Magnesium.*—Thorium dioxide is reduced to thorium on heating. When the experiment is conducted in hydrogen, the latter is absorbed, and *thorium hydride*, $ThH_2$, is formed. A monoxide does not appear to exist.—C. Winkler, Journ. Chem. Soc., 1891, 802, from Ber., xxiv., 873.

## GERMANIUM.

*Germanium—Action of Magnesium.*—The oxide is reduced to germanium with a violent report and scattering of the mass.—C. Winkler, Journ. Chem. Soc., 1891, 802, from Ber., xxiv., 873.

## ZIRCONIUM.

*Zirconium.*—L. Ouvrard has obtained the calcium, strontium and barium zirconates, and established an additional analogy between zirconium, tin and titanium.—Chem. News, July 31, 1891, 61, from Comptes rendus, cxiii., 1891, 80.

*Zirconium—Action of Magnesium.*—The reduction of zirconic anhydride by magnesium takes place at high temperatures, but is usually incomplete; if performed in an atmosphere of hydrogen, the latter is rapidly absorbed with the formation of black *zirconium hydride*, $ZrH_2$. Zirconium hydride is inflammable, and is not attacked by acids.—C. Winkler, Journ. Chem. Soc., July 1891, 802, from Ber., xxiv., 873–899.

## METALS.

*Metals—Electrolytic Separation.*—Edgar F. Smith and Frank Muhr have found that several metals can be separated electrolytically. See further under *Gold*, *Silver*, and *Mercury*.

*Metals—Electrolytic Quantitative Separation.*—T. O'Connor Sloane calls attention to a point which has been overlooked thus far, and that is

the influence of difference of electrical potential in analytical work. It is well established that for the decomposition of every solution a definite and absolutely fixed voltage is required. The strength of the current affects only the condition of the deposit. A single gravity cell, large or small, cannot decompose water, because the voltage is too low; whilst the minutest bichromate cell will at once begin to decompose water, because its voltage is high enough. It follows then that the voltage should be made the basis for analytical work. It would be possible to effect successive separation of metals from the same solution by modifying the voltage, starting, of course, with the lowest.—Chem. News, 1891, lxiv., 83, from Journ. Am. Chem. Soc., xiii.

——— In the determination of metals by the electrolysis of their solutions, it is essential for the metal to be separated out quantitatively as such, or in the state of a known compound, and then that the precipitate obtained forms a uniform coating on the platinum used as an electrode, and adheres so firmly that no loss takes place on rinsing with water and alcohol, and undergoes no change on drying. Not a few of the metals, which have been hitherto determined electrolytically, present difficulties in electrolysis, requiring more or less special precautions. C. Luckow first observed the formation of amalgams on the simultaneous deposition of mercury and of other metals, which leads him and W. Gibbs to recommend the addition of mercury, by placing a weighed quantity upon the bottom of the beaker and calculating the quantity of metal deposited from the increase in the weight of the mercury. G. Vortmann prefers to use mercuric chloride, or in acid solutions precipitated mercuric oxide, both being easier to handle and obtained in a pure condition. The precipitates are first washed with water, then with alcohol, and lastly with ether, then dried by gently blowing upon it, and finally placed in the desiccator. No loss of mercury will take place even if left for days in the desiccator. Vortmann gives detailed directions for the separation of the individual metals, for which see the original article.—Chem. News, 1891, lxiv., 227, 241, 252.

*Alloys—New Process.*—W. Hallock suggests the following law as being highly probable: An alloy can be produced out of its original constituents without considerable pressure, if the temperature be above the melting point of the alloy, even though it be far below the melting point of the most easily fusible constituent. He adduces the following experiments in support: When the metals of which Wood's alloy is composed are filed to fine grains and intimately mixed in the ratio of 1 part of cadmium (melt. point 315° C.), 1 part of tin (m. p. 230° C.), 2 parts of lead (m. p. 325° C.), and 4 parts of bismuth (m. p. 267° C.), and the mixture is tightly packed in a glass tube heated at 98–100° C. in a water-bath, in the course of some hours (generally a day or two) a homogeneous, liquid globule of the alloy is formed. On the same principle, lead and tin may

be melted together at 190–200° C. by simply laying a piece of tin on a carefully cleaned strip of lead, and placing the whole in an air-bath kept at the required temperature.—Jour. Chem. Soc., July 1891, 805; from Chem. News, lxiii., 17.

*Gold-colored Alloy.*—T. Held makes an alloy by melting 100 parts of copper and adding 6 parts of antimony, then fluxing the mass in the crucible with an addition of wood ashes, magnesia and carbonate of calcium, which increases the density of the mass when cast. This alloy can be worked the same as gold, and keeps its gold color unchanged, even after long exposure to ammonia and acid vapors.—Am. Drug., Aug. 1891, 239.

*Amalgams,* see under *Hydrargyrum.*

## MANGANUM.

*Manganese—Volumetric Estimation.*—Dissolve 5 gm. of the ore, etc., in boiling concentrated hydrochloric acid, and dilute to 250 c.c. To 50 c.c. (= 1 gm. ore) in a beaker add a few drops ferric chloride, 30 c.c. of cold saturated solution of ammonium chloride, and 30 c.c. of a solution of tartaric acid (1 : 2) and ammonia largely in excess. Heat to boiling, and run in from a burette solution of ferrocyanide of potassium, until a drop gives a blue spot on a porcelain plate with concentrated acetic acid. Theoretically 1 cgm. of a solution, containing 38.487 gm. of crystallized ferrocyanide of potassium to the litre, should indicate 0.005 gm. of manganese, but practically it will be less; a blank experiment is therefore advisable.—L. Blum.—Chem. Zeitg., (Rep.), 1891, 207; from Zeits. analyt. Chem., 1891, 284.

## FERRUM.

*Iron—Volatility.*—Flirtmann has found that iron is volatile at a cherry-red heat. Two superimposed plates, one of iron and one of nickel, having been submitted to a similar heating, the iron passed over to the nickel in notable quantity without either soldering or adhesion of the surface. Over the entire sheet of nickel there was formed an alloy of iron, which in sheets of 1 mm. penetrated to 0.05 of their thickness, and contained a mean of 24 per cent. of iron. This volatility of iron is still unexplained. —Chem. News, July 24, 1891, 50.

*Iron—Volatility on Treatment with Hydrochloric Acid.*—See under *Nickel.*

*Iron—Test for Arsenic.*—Otto Sautermeister points out that the presence of arsenic in powdered or reduced iron cannot be detected by the process of the German Pharmacopœia (Marsh's test), although Bettendorff's test shows it readily enough. The addition first of traces of arsenious oxide to iron, subjected to the above test, and later, quantities as high as 0.1 gram arsenious oxide, failed to produce reaction. Examination of the

residue insoluble in the acid showed the presence of the arsenic in the metallic state; the arsenic present in the iron as well as the added arsenious oxide had been reduced to the metallic condition by the iron or ferrous chloride or nascent hydrogen, hence formed no volatile hydrogen compound.

It was found that antimony acted in the same way as arsenic in this test; the metal was always found in the insoluble residue.

If metallic zinc be added in the test (5 gm. zinc, 2 gm. iron, 30 c.c. hydrochloric acid, and 5 c.c. water), the evolved gas will readily stain porcelain if arsenic be present.

On looking up the literature, it was found that Woehler, as long ago as 1839, had called attention to this fact. (J. G. Bergmann, also, see Proceedings 1888, xxxvi., 457, from Pharm. Centralh., No. 8.—Reporter).—Am. Journ. Pharm., 1891, 460, from Chem. Zeitg., 1891, 1021; Am. Drug., 1891, 269.

*Steel—Determination of Carbon.*—By A. A. Blair.—Chem. News, 1891, lxiv., 66.

*Iron, Detection in Clay, etc.*—See under *Aluminium.*

*Iron—Densimetric Estimation of Phosphorus.*—According to E. Metz, the principle introduced by Popper in 1877, of ascertaining the weight of a precipitate without washing or drying it, by transferring it to a specific gravity bottle, which is filled up with a liquid of known density, and weighing the whole, can be made suitable for ammonium phosphomolybdate, owing to the high specific gravity of the precipitate, which was found to be 3.252. The oxidized solution of the iron (0.5 gm. in 50 c.c.) after removal of the silica, is mixed in a specially described vessel first with 20 c.c. of strong ammonia, and then with just enough nitric acid to redissolve the precipitate; then, without allowing to cool, 100 c.c. of molybdate solution at about 60° C. is added, the whole well shaken, and the precipitate allowed to subside. After ascertaining the specific gravity of a portion of the clear liquid, the precipitate is poured into the pyknometer. In six test analyses the results agree closely enough with those of gravimetric estimations to be employed for technical purposes.—Journ. Chem. Soc., Aug. 1891, 961, from Zeits. Anal. Chem., xxx., 200–206.

"*Iron-plating.*"—Boettger's method for facing metallic surfaces with a steel-like, pure iron (copper, zinc, type metal, etc.,) is as follows: Mix 100 parts of ammonio-ferrous sulphate with 50 parts of ammonium chloride, and dissolve in 500 parts of water; acidulate slightly with a few drops of sulphuric acid. Connect the surface to be covered with the negative pole of a battery of two or three Bunsen elements, an iron plate of equal size being employed as an anode. Maintain the solution at 70°–80° F.—Pharm. Record, 1891, xii., 261; from Nat. Drug.

*Iron—Therapy.*—Dr. T. Clifford Allbut states that much of the want of

success in the treatment of anæmia and chlorosis is due to the prevailing economy in the use of iron. No form of iron is so efficient as the sulphate, of which the commencing dose should be 1 grain thrice a day for the first week, then 2 grain doses for ten days, and so on until 9 or even 12 grains are taken in a day; of course, variously combined to suit the individual cases. The constipation is best met with small doses of extract of aloes.—Am. Drug., July 1891, 200; from Brit. Med. Jour.

*Iron—Proportion Present in the Most Important Articles of Food.*—G. Bunge has compiled the following table, showing the proportion of iron in the most important articles of food, giving also the names of the authors:

100 gm. of the dry substance contain the following number of mgm. of iron:

| | | |
|---|---|---|
| Blood serum | 0 | C. A. Socin. |
| Egg albumen | traces | Bunge. |
| Rice | 1.7 | Boussingault. |
| Rice | 1.9 | Bunge. |
| Cow's milk | 2.3 | Bunge. |
| Woman's milk | 2.3–3.1 | Bunge. |
| Dog's milk | 3.2 | Bunge. |
| Wheat | 5.5 | Bunge. |
| Potatoes | 6.4 | Boussingault. |
| Peas | 6.6 | C. Schmidt. |
| Beans | 8.3 | Boussingault. |
| Strawberries | 8.6–9.3 | Bunge. |
| Lentils | 9.5 | Boussingault. |
| Apples | 13.2 | Boussingault. |
| Beef | 16.6 | Bunge. |
| Yolk of egg | 10.4–23.9 | C. A. Socin. |
| Spinach | 32.7 | Bunge. |
| Spinach | 39.1 | Boussingault. |
| Blood (swine) | 226 | Bunge. |
| Hæmoglobin | 340 | Zinoffsky and Jaquet. |

It appears that, contrary to expectation, milk contains much less iron than most of our daily food.—Chem. Zeitg., 1892 (Rep.), 36; from Zeits. physio. Chem., 1892, 173.

*Iron Carbonyl—Preparation.*—Ludwig Mond and Carl Langer obtain it as follows: Ferrous oxalate is first prepared by precipitation of a hot solution of ferrous sulphate with a slight excess of potassic oxalate well washed and dried at 120° C. The dry powder is introduced in a combustion tube and heated in a gentle current of hydrogen, raising the temperature gradually until the oxalate has turned black. The finely divided iron is allowed to cool to the ordinary temperature, and is then put into water without allowing it to come in contact with the air; it is boiled until all sulphate is removed, dried quickly on gypsum plates, returned to the combustion tube, and slowly heated in a current of hydrogen to about 300° C., to drive off all the water. After allowing it to cool again, the current of hydrogen

is replaced by one of carbon monoxide. After 24 hours, the tube is heated to about 120° C., when the iron carbonyl distils over. As only a small quantity is formed at a time, the remaining iron must repeatedly be exposed to carbon monoxide. It is an amber colored liquid, which on standing deposits tabular crystals of a darker color, and solidifies entirely below 21° C. to a mass of needle-shaped crystals. It boils at 102° C. The authors describe ferropentacarbonyl and diferroheptacarbonyl.—Jour. Chem. Soc., 1891, 1090.

*Iron—Volatile Compound with Carbonic Oxide.*—L. Mond and F. Quincke have succeeded in obtaining this compound, which probably is an iron-tetra-carbonyl, $Fe(CO)_4$, analogous to nickel-tetra-carbonyl.—Jour. Chem. Soc., Aug. 1891, 604.

*Iron—Estimation of the Scaled Salts.*—F. B. Power reviews the whole subject of officinal scaled salts of iron, especially with a view to their chemical characters (constitution) and to their correct estimation. He contends that, in view of the fact that they have only been obtained in an amorphous or scale-like form, and that their composition is by no means so constant as to admit of expression by a simple empirical formula, any attempt to represent the grouping of the atoms in the molecule must be regarded as an idle phantasy. The existing empirical as well as structural formulas, appear to have been based chiefly, if not solely, upon the amount of the product resulting from the admixture of certain salts, and not upon actual analytical data, which are almost entirely wanting.

In connection with the tests for identity our present Pharmacopœia requires of three of the scale salts that they should afford a certain amount of residue upon ignition, and with two others the amount of iron which they represent is stated, but without any intimation as to how this shall be determined. The accurate determination of the iron in simple salts of organic acids by the method of ignition is attended with some difficulties, owing to the large amount of carbonaceous matter separated, and the difficulties become enhanced in the presence of alkaline carbonates (as in the incineration of the officinal phosphate and pyrophosphate of iron). Power, therefore, calls attention to the iodometric method, originally proposed by F. Mohr, Carl Mohr, and, especially, by C. Schacht. This method is based on the liberation of iodine by a solution of ferric chloride, and the subsequent estimation of the liberated iodine by a decinormal solution of sodium thiosulphate. One atom of iodine is equivalent to one atom of iron, and each c.c. of the decinormal thiosulphate solution corresponds to $\frac{1}{10000}$ of the atomic weight of iron, or 0.0056 gm. The modification of Ph. German., of oxidating the ferrous compounds with potassium permanganate instead of with potassium chlorate and hydrochloric acid, deserves to be adopted. The iodometric method involves but one accurate weighing, and the whole operation can be performed in a single flask, in the shortest time possible.

For the results of Power's investigations of the different salts of iron, see below, in alphabetical order.—Pharm. Rundschau, N. Y., 1891, 205–217.

*Ferric albuminate—Estimation of iron.*—Bosetti gives a method for the estimation, which differs but little from that of Itallie (which see). Triturate 0.5 gm. of ferric albuminate with a mixture of 0.2 gm. of soda solution (P. G.) and 20.0 of water, and transfer to a beaker. After solution add 5.0 gm. hydrochloric acid (P. G.), and heat on a water-bath until the separated albumen has been completely decomposed. To the filtrate add a small quantity of potassium chlorate, and evaporate to dryness. Dissolve in water, acidulated with hydrochloric acid, dilute to 100 c.c., add 3.0 gm. of potassium iodide, and allow it to stand at 40° C. for half an hour. After cooling, titrate with decinormal hyposulphite.—Pharm. Rundschau, N. Y., 1891, 169; from Helfenberg. Annalen, 1890, 36.

*Iron, Subcarbonate, Preparation.*—J. A. Forrest proceeds as follows:

A convenient quantity of crystallized ferrous sulphate is placed in a muslin bag and suspended in a wide-mouthed bottle containing sufficient boiled water, and allowed to dissolve by circulatory displacement. Alkaline carbonate in slight excess (the author prefers potassium bicarbonate) is placed into the wash-bottle and the bottle corked. The tubes A and C are closed by means of pinchcocks, and a current of coal-gas or carbonic anhydride passed through the bottle for a few minutes. A sufficient quantity of boiled water is run into the bottle by the syphon attached to the tube A, and the carbonate dissolved. When both salts are dissolved, the ferrous sulphate solution is gradually added to that in the bottle by the tube B, and the bottle filled up with water. After the precipitate has subsided (which can be hastened by placing the bottle for a few minutes in hot water), the solution of potassium sulphate is run off through the syphon C, and the bottle filled up with boiled water as before. While the operation is progressing, a gentle current of gas is allowed to pass through the bottle.—Pharm. Jour. Trans., Sept. 1891, 225.

*Ferri Chloridum—Estimation of Iron.*—F. B. Power dissolves 2.8 gm. of the ferric chloride in water to the measure of 50 c.c. 10 c.c. of this solution (representing 0.56 gm.) are brought into a glass-stoppered bottle, diluted with 10 c.c of water and 2 c.c. of hydrochloric acid added, and subsequently 1 gm. of potassium iodide. Then proceed as described under ferri citras; not less than 20 c.c. of the decinormal sodium thiosulphate solution should be required, indicating no less than 20 per cent. of iron.—Pharm. Rundschau, N. Y., 1891, 214.

*Ferric Oxychlorides—Crystalline.*—M. G. Rousseau observed the formation of a crystalline oxychloride of iron, $2Fe_2O_3.Fe_2Cl_6.3H_2O$, when a very concentrated solution of ferric chloride was maintained at a temperature of 160°–220° C. for a considerable time. On prolonged contact with boiling water, this compound undergoes a progressive saponification, and is

eventually transformed into an isomorphic ferric hydrate $(Fe_2O_3H_2O)_2$. At temperatures above 220° C., a series of anhydrous crystalline oxychlorides of the general formula $(Fe_2O_3)_n.Fe_2Cl_6$ are formed, which by the action of boiling water are saponified according to the general equation. $(Fe_2O_3)_n.Fe_2Cl_6+3H_2O=(Fe_2O_3)_{n+1}+6HCl$. At a temperature between 225° and 280° C., the oxychloride $2Fe_2O_3.Fe_2Cl_6$ has been obtained, and between 300° and 340° C. that of $3Fe_2O_3.Fe_2Cl_6$. These compounds are amorphous, reddish to blackish-brown, not readily soluble in dilute mineral acids. The author thinks that compounds may be obtained at still higher temperatures with a regular increased proportion of $Fe_2O_3$, and that possibly finally hæmatite will be synthesized.—Pharm. Jour. Trans., Nov. 1891, 427, from Comptes rend., 1891, cxiii., 542.

*Ferri Citras—Its Constitution and the Estimation of Iron.*—F. B. Power points out that the officinal formula, $Fe_2(C_6H_5O_7)_2+6H_2O$, appears to be based upon an analysis by Rieckher of the first crop of crystals, which separate on evaporating a solution of this salt to a syrupy consistence. He determined the loss of water on drying at 120° C., the amount of ferric oxide by ignition, and calculated the citric acid by the difference. The mother liquor from these crystals, however, on further evaporation, yielded crystals of an entirely different composition. Power quotes the results of the analyses of Duflos, Hager, Ph. Belgica, Ph. Rossica, Wittstein, Duvivier, Rother, Fehling and Schmidt, which show great diversity, not only in the formula, but also in the amount of water and the temperature at which the latter is eliminated. Power himself comes to the conclusion that the amount of water in ferric citrate, even when prepared by essentially the same process, is subject to great variation, and can not be expressed by a definite number of molecules. As to the amount of the iron, Power concludes from his experiments with ferric citrate, made by himself, that its composition by the official method of preparation is not constant; he therefore urges that the recognition of even an empirical formula for this salt, as well as for the other scale salts, be abandoned, and that the official requirement shall be limited to the determination of the presence of a minimum of iron, which, of course, does not exclude the qualitative tests or the determination of the proper amount of alkaloid in the alkaloidal scale salts. In regard to the estimation, Power does not think it expedient to require more than 16 per cent., and proposes the following quantitative test:

"If 0.56 gm. of citrate of iron be dissolved in a glass-stoppered bottle in 15 c.c. of water and 2 c.c. of hydrochloric acid, with the aid of a gentle heat, and, after the addition of 1 gm. of potassium iodide, the mixture be allowed to stand for half an hour at a temperature not exceeding 40° C. (104° F.), and then allowed to cool, it should, after the addition of a few drops of starch (test solution), require not less than 16 c.c. of deci-normal sodium thiosulphate before the blue or greenish color of the liquid is dis-

charged (each c.c. of the deci-normal solution corresponding to 1 per cent. of iron)."—Pharm. Rundschau, N. Y., 1891, 206–209.

*Ferri Citras Effervescens.* See under *Salia.*

*Ferri et Ammonii Citras—Its Constitution and the Estimation of Iron.*—F. B. Power objects to the title that it is a misnomer, there being no evidence that it is a true double salt, the amount of ammonium citrate probably depending upon the acidity or basicity of the respective ferric citrate. He therefore proposes to name it "soluble citrate of iron." The Pharmacopœia should require it to contain at least 16 per cent. of metallic iron, and the estimation might be worded as follows:

If 0.56 gm. of soluble citrate of iron be dissolved in a glass-stoppered bottle in 15 c.c. of water and 2 c.c. of hydrochloric acid, and, after the addition of 1 gm. of potassium iodide, the mixture be allowed to stand for half an hour at a temperature not exceeding 40° C. (104° F.), and then allowed to cool, it should, after the addition of a few drops of starch (test solution), require not less than 16 c.c. of decinormal sodium thiosulphate, before the blue or greenish color of the liquid is discharged (each c.c. of the decinormal solution corresponding to 1 per cent. of iron).—Pharm. Rundschau, N. Y., 1891, 209.

*Ferri et Ammonii Sulphas—Estimation of Iron.*—F. B. Power estimates the iron in this salt volumetrically with iodine as described under Ferri citras; not less than 11.6 c.c. of the decinormal solution of sodium thiosulphate should be required, corresponding to not less than the theoretical amount of iron, viz., 11.6 per cent.—Pharm. Rundschau, N. Y., 1891, 214.

*Ferri et Ammonii Tartras—Its Preparation and the Estimation of Iron.*—F. B. Power finds, what has also been observed by others, that the proportion of tartaric acid is largely in excess of what is necessary (about three times as much). He gives the following proportions as the correct ones:

| | |
|---|---|
| Solution of tersulphate of iron | 60 gm. |
| Tartaric acid | 13 gm. |
| Distilled water | 100 c.c. |
| Water of ammonia, | |
| Water, each, a sufficient quantity. | |

Dissolve one-half of the tartaric acid (6.5 gm.) in 100 c.c. of distilled water, neutralize the solution exactly with ammonia water, then add the remainder of the tartaric acid, and dissolve by the application of a gentle heat. Now bring in the freshly precipitated ferric hydrate in successive portions, stirring constantly, and continuing the heat until it is dissolved. Filter the solution while hot, evaporate at a temperature not exceeding 60° C. to the consistence of syrup, and spread on glass to scale.

With ammonia water the neutralization can be much more quickly and conveniently effected than with ammonium carbonate. The estimation of

the iron is effected in the same manner as described under Ferri citras; not less than 17 c.c. of the decinormal solution of sodium thiosulphate should be required, which corresponds to not less than 17 per cent. of metallic iron.—Pharm. Rundschau, N. Y., 1891, 213.

*Iron and Manganese Carbonate—Preparation.*—According to Pollacoi, 151.14 parts of manganous sulphate and 152 of ferrous sulphate are dissolved in sufficient water. This solution is mixed with a solution of 212 parts of sodium bicarbonate, and heated nearly to boiling, in order to render the precipitate more compact. When the latter has settled, the supernatant liquid is poured off, and the precipitate is washed, first with water and then with alcohol, and dried.—Pharm. Post, 1891, 1105; from Bollet. farm.

*Iron and Manganese Citrate—Preparation.*—According to Pollacci this salt is best prepared as follows: A solution of citric acid is neutralized by the addition of iron and manganese carbonate, until the evolution of carbonic acid gas ceases; on heating the remainder of the gas is distilled.

*Iron and Manganese Lactate* is made similarly, substituting lactic acid for the citric acid.—Pharm. Post, 1891, 1106; from Bollet. farm.

*Ferri et Potassii Tartras—Its Preparation and the Estimation of Iron.*—The 4 parts of potassium bitartrate, directed by the Pharmacopœia, being somewhat in excess of the theoretical proportion, and as there is a liability of some loss of ferric hydrate in the operation of washing, etc., thus rendering the excess still greater, F. B. Power proposes to use only 3.25 parts of potassium bitartrate and 12 parts of solution of tersulphate of iron, which in his hands has given good results. He also calls attention to Soubeiran's recommendation to mix the potassium bitartrate with the water, heat the mixture on a water-bath at a temperature not exceeding 60° C., and gradually add the freshly precipitated ferric hydrate, which is better than the inverse method of our Pharmacopœia. If Soubeiran's view of its composition be correct, $K(FeO)C_4H_4O_6$, this salt would be analogous to tartar emetic, $K(SbO)C_4H_4O_6$. The estimation is conducted in the same way as under ferri citras, but not less than 15 c.c. of the decinormal sodium thiosulphate solution should be required, corresponding to 15 per cent. of iron.

On the addition of the hydrochloric acid a slight turbidity is produced, but on the subsequent addition of potassium iodide the liquid becomes clear.—Pharm. Rundschau, N. Y., 1891, 213.

*Ferri et Quininæ Citras—Estimation of the Alkaloid and of the Iron.*—F. B. Power estimates both the alkaloid and the iron from one portion of the salt, the alkaloid being separated first. He gives the details of the estimation as follows:

*Assay for Alkaloid.*—1.12 gm. of citrate of iron and quinine are dis-

solved in a capsule, with the aid of a gentle heat in 20 c.c. of water. The solution, together with the rinsings of the capsule, are transferred to a separating funnel, and, when cool, 5 c.c. of ammonia water are added, and the mixture immediately shaken with three successive portions of chloroform of 10 c.c. each. The combined chloroformic liquids, carefully decanted from any adhering drops of aqueous liquid, are transferred to a tared capsule, allowed to dry spontaneously, and the residue finally dried at a temperature of 100° C. (212° F.). This residue should weigh not less than 0.1232 gm., nor more than 0.1344 gm. (corresponding to from 11 to 12 per cent. of quinine), and should respond to the tests for purity, as described under quinine.

"*Assay for Iron.*—The aqueous liquid, from which the alkaloid has been extracted in the above-described process, is transferred to a porcelain capsule, and heated on a water-bath until the odor of chloroform and ammonia has disappeared, and allowed to cool. It is then diluted with water to the measure of 50 c.c., and to 25 c.c. of this liquid, contained in a glass-stoppered bottle, are added 2 c.c. of hydrochloric acid and 1 gm. of potassium iodide, and the mixture allowed to stand for half an hour at a temperature not exceeding 40° C. (104° F.)." The remainder is as under Ferri citras.—Pharm. Rundschau, N. Y., 1891, 209.

*Ferri et Quininæ Citras Solubilis.*—F. B. Power recommends the process of L. E. Sayre as giving a satisfactory salt.

| | |
|---|---|
| Citrate of iron ........................................ | 88 gm. |
| Quinine, dried at 100° C. (212° F.) until it ceases to lose weight.. | 12 gm. |
| Water of ammonia ........................................ | 15 c.c. |
| Distilled water, a sufficient quantity. | |

Dissolve the citrate of iron in 160 c.c. of distilled water by heating on a water-bath, then add the quinine, and continue the heat with constant stirring until the latter is dissolved. When cool, gradually add the ammonia, stirring after each addition until the precipitated quinine is re-dissolved. Finally, evaporate the solution at a temperature not exceeding 60° C. (140° F.) to the consistence of syrup, and spread on plates of glass, so that on drying the salt may be obtained in scales. Power suggests that this salt should contain not less than 11.5 per cent. nor more than 12.5 per cent. of quinine, and not less than 12.5 per cent. of iron.—Pharm. Rundschau, N. Y., 1891, 211.

*Ferri et Strychninæ Citras—Estimation of the Alkaloid and the Iron.*—F. B. Power suggests that this salt should contain not less than 0.9 to 1 per cent. of strychnine, and not less than 16 per cent. of iron. The method of examination is shortly as follows:

2.24 gm. of this salt are dissolved in 15 c.c. of water in a glass separating funnel, 5 c.c. of ammonia added, and the liquids immediately shaken with three successive portions of chloroform, 10 c.c. each. The chloro-

formic solutions, when evaporated spontaneously, and the residue dried at 100° C., should give not less than 0.02 gm., nor more than 0.0224 gm. of strychnine.

The liquid is then heated on a water-bath to expel chloroform and ammonia, allowed to cool, diluted to the measure of 100 c.c., and 25 c.c. of this liquid employed for the estimation of iron, as described under ferri citras. Not less than 16 c.c. of the decinormal sodium thiosulphate should be required.

*Ferri Hypophosphis—Estimation.*—F. B. Power endeavored to estimate the iron by the iodometric method, which he has so successfully employed for the other officinal iron salts; but since an amount of the salt which would be convenient and accurate for the estimation would require an inconveniently large amount of potassium permanganate for the oxidation of the hypophosphorous radical, and since it is unquestionably more important in this case that the presence of a proper amount of hypophosphorous acid should be established than that the amount of iron should serve as acriterion for its purity, Power thinks that the gravimetric method of F. X. Moerk (see Proceedings 1891, xxxix., 495) ought to be employed. He tried to prepare a soluble scale salt by following the suggestion in Oldberg and Long's "Laboratory Manual," p. 227, but failed in making the salt scale—it remained in the form of a sticky varnish.—Pharm. Rundschau, N. Y., 1891, 215.

*Ferri Lactas—Estimation in Iron.*—F. B. Power states that this salt may be estimated iodometrically, as described under Ferri citras, by adding to the aqueous solution, containing hydrochloric acid, a solution of potassium permanganate until the red color ceases to immediately disappear, and then proceeding as detailed. In this operation, however, much more permanganate is consumed than is necessary for the oxidation of the ferrous iron, showing that the lactic radical also becomes oxidized, even in the cold, and the results show that the correctness of the estimations appear to be influenced by the more or less complete oxidation of the lactic radical. Power thinks it therefore better to estimate the iron by ignition, requiring that the yield of ferric oxide shall be not less than 27 per cent. —Pharm. Rundschau, N. Y., 1891, 215.

*Iron Hydroxide—Preparation.*—M. C. Traub recommends the method of Dieterich as the best for obtaining an easily soluble precipitate. A mixture of 75 parts of ammonia and 125 parts of water is poured slowly in a thin stream with constant stirring into a mixture of 100 parts of solution of chloride of iron (Ph. German.) and 100 parts of water. The clear solution of oxychloride is diluted with water to 1000 parts, and after cooling it is poured in a thin stream into a mixture of 25 parts of ammonia and 975 parts of water, stirring constantly. The precipitate is quickly washed, and then treated further according to the preparation to be made.

—Schweiz. Woch., 1892, 41. (The relative proportions are somewhat different from those given in Proceedings 1888, xxxvi., 261.)

*Iron—Hydrated Sesquioxide.*—E. A. Schneider states that ferric hydrate is freely soluble in solutions of the ordinary aluminium salts. By suitable treatment with a solution of aluminium chloride or nitrate, it can readily be converted into a colloidal modification soluble in water.—Yearbook, 1891, 23, from Liebig's Annalen, cclvii., 359–380.

*Ferric Oxide—Direct Titration.*—H. Morath has communicated a method which is based on the two well known reactions: (1) The red coloration produced by sulphocyanide of potassium, and (2) the precipitation of Prussian blue by ferrocyanide of potassium. A solution of a ferric salt, to which a little sulphocyanide of potassium has been added as indicator, is titrated with normal potassium ferrocyanide, until ether, shaken with the liquid, separates colorless; it will separate with a red color, due to ferric sulphocyanide, as long as the formation of Prussian blue takes place.—Pharm. Centralhalle, 1891, 479.

*Ferric Peptonate—Estimation of Iron.*—Dissolve 0.5 gm. of ferric peptonate in 20.0 gm. of hot water, heat with 10.0 gm. dilute sulphuric acid until clear, dilute with 200.0 gm. of hot water, add excess of ammonia, and heat on a water bath until the precipitate has separated entirely. The precipitate is collected on a filter, washed with hot water until the filtrate remains clear on addition of solution of barium nitrate, the precipitate is then dissolved in hot dilute sulphuric acid. This solution is now diluted with water to 100 c.c., 3.0 gm. of potassium iodide added, and the liquid proceeded with as directed under ferric albuminate.—Pharm. Rundschau, N. Y., 1891, 169, from Helfenberg. Annalen.

*Ferri Phosphas—Estimation of Iron.*— F. B. Power states that this salt, although it contains probably not less than four salts, might appropriately be named "Ferri phosphas solubilis" to distinguish it from the old phosphate, formerly officinal. In regard to the proportions of citrate of iron and phosphate of sodium, Power states that 5.5 parts of the sodium salt to 5 parts of the iron salt gives a handsomer product.

The requirement Power would put as under Ferri citras, starting from 0.56 gm. of the salt, and requiring not less than 12 c.c. of the decinormal sodium thiosulphate solution; this would then indicate at least 12 per cent. of iron.—Pharm. Rundschau, N. Y., 1891, 211.

*Ferric Phosphate and Ferric Pyrophosphate—Purity.*—Julius Stieglitz finds the pharmacopœial tests in many respects unsatisfactory, especially the silver test unless the citric acid is first separated. He states, that the precipitate by silver nitrate of phosphoric acid in the presence of citrates, and on the other hand of pyrophosphoric acid in the presence both of citric acid and varying amounts of phosphoric acid, is nearly identical in appearance, being a very pale-yellow salt which one is loth to regard as either phosphate or pyrophosphate. The presence of acetic acid makes

the reaction yet more confusing, phosphate of silver being apparently more soluble in this acid than the citrate or pyrophosphate; if after complete precipitation a little ammonia is added, bright-yellow silver phosphate is thrown down in both cases.

After trying several methods, especially with a view to obtaining a positive reaction for pyrophosphate without the possibility of mistaking the citric acid present for it, the author adopted the following, involving the use of an excess of magnesium sulphate:

5 c.c. of a 20 per cent. aqueous solution of the salt are added to about 9 c.c. of a ten per cent. solution of potassa, previously heated to boiling, and the boiling continued for a moment; after cooling and filtering, one can use the filtrate which I will call "A" for the following tests:

(1) If phosphate of iron is before us, to a few c.c. of the alkaline filtrate, some ammonium chloride and 1 to 2 c.c. of 10 per cent. solution of magnesium sulphate are added. The easily recognized crystalline precipitate of magnesium ammonium phosphate thus produced is best filtered, washed with water and converted into the silver salt. It may be dissolved in a few drops of nitric acid, ammonia added just till the precipitate reappears, and the precipitate taken up with a drop of acetic acid. Addition of silver nitrate solution now produces, if the salt examined is really iron phosphate, a bright-yellow precipitate of pure silver phosphate, not mixed with white silver citrate. If the quantity and nature of the precipitate of $Mg(NH_4)PO_4$, or a whitish color of its silver salt makes the chemist suspect that by an error pyrophosphate of iron has been furnished, he can test another portion of the alkaline filtrate "A" for pyrophosphates in the manner described below (3).

(2) If the salt to be tested purports to be pyrophosphate of iron U. S. P., a portion of the alkaline filtrate "A" is tested first for contaminating phosphates by the method described above, only using instead of an excess of solution of magnesium sulphate two to four drops of the same. In this way magnesium pyrophosphate, which is precipitated at the first admixture of the reagent, redissolves in the excess of alkali pyrophosphate, while phosphates, if present, are precipitated as magnesium ammonium phosphate. A good preparation should not yield more than a very slight turbidity of phosphate. If a precipitate is formed, it is filtered after five minutes, washed and converted into the silver salt. In this way the admixture of one part of phosphate to nine parts of pyrophosphate of iron could be easily detected.

A still more convenient method is based on the fact that on boiling an alkaline solution of the phosphates, previously acidified with acetic acid, with a solution of magnesium sulphate, magnesium pyrophosphate is thrown down, but not the phosphate.

(3). Another part (3 c.c.) of the alkaline filtrate "A" is now tested for pyrophosphates by neutralizing with acid and then adding an excess of

five to six drops of acetic acid (36 per cent.) and 1.5 c.c. magnesium sulphate solution. On boiling the clear solution, magnesium pyrophosphate is precipitated, if present, while if the salt was a phosphate no precipitation occurs. For further identification the precipitate can be filtered hot and washed with hot water till the washings are neutral. If it be dissolved in a drop or two of nitric acid, reprecipitated with ammonia and redissolved with a drop of acetic acid, silver nitrate will produce white earthy pyrophosphate of silver. A very slight yellowish tinge may occur from insufficient washing, but there is no possible mistaking of the precipitate, the citric acid having been removed from the solution. In this manner the presence of pyrophosphate is proved beyond doubt, the demonstration resting on positive reactions. The whole examination can be completed very nearly as quickly as the U. S. P. test.—Am. Journ. Pharm., 1891, 585–593.

*Ferri Pyrophosphas—Estimation of Iron.*—F. B. Power proposes to name it "Ferri pyrophosphas solubilis." As to the proportions of citrate of iron and sodium pyrophosphate, he thinks that equal weights of both salts would give a better product.

The requirement Power would put as follows:

If 0.56 gm. of soluble pyrophosphate of iron be dissolved in a glass-stoppered bottle in 10 c.c. of water, then 10 c.c. of hydrochloric acid, and subsequently 40 c.c. of water added, and, after the addition of 1 gm. of potassium iodide, the mixture be allowed to stand for half an hour at a temperature not exceeding 40° C. (104° F.), and then allowed to cool, it should, after the addition of a few drops of starch (test-solution) require not less than 10 c.c. of decinormal sodium thiosulphate, before the blue or greenish color of the liquid is discharged (each c.c. corresponding to 1 per cent. of iron).—Pharm. Rundschau, N. Y., 1891, 212.

*Natrium Pyrophosphoricum Ferratum*—(Ferri pyrophosphas). *German Unoff. Formulary.*

| | |
|---|---|
| Sodium Pyrophosphate | 20 parts. |
| Solution of Chloride of Iron (Germ. Pharm., spec. grav. 1.280) | 12 " |
| Water | q. s. |
| Alcohol | 100 parts. |

Reduce the sodium pyrophosphate to powder and mix it with 40 parts of cold water; then add, constantly stirring, the solution of chloride of iron previously diluted with 18 parts of water, in small portions at a time, allowing any produced precipitate to become redissolved before a new portion of the iron solution is added. To the green solution thus finally produced add the alcohol, separate the precipitate caused thereby, wash it with a little alcohol, press between filtering paper, and dry in a lukewarm place.

The product is a white, odorless, faintly saline powder, having only a slight ferruginous taste and a faintly alkaline reaction.—Am. Drug., 1892, 38.

*Ferrum Reductum—Purity of Commercial.*—T. A. Ellwood examined

eight samples, with the following remarkable results: 3, 23, 43, 54, 62, 69, 74 per cent. of metallic iron, the three last ones of his own make. Ph. Brit. requires only 50 per cent. The 80 per cent. of the U. P. he considers excessive.—Pharm. Jour. Trans., Nov. 1891, 393.

*Ferrum Reductum—Estimation.*—In view of the fact that the test of the U. S. Ph. does not permit of determining the actual amount of metallic iron, but simply indicates whether more or less than 80 per cent. is present, F. B. Power recommends the iodometric method of the Ph. German., calling attention, however, to the incorrect adjustment of the proportions of mercuric chloride and iron (as pointed out by Hirsch and Schneider), the iron being in considerable excess, the amount of mercuric chloride being able to convert only little more than half the iron into ferrous chloride.

With this correction, the test of Ph. German. reads as follows:

Heat 0.56 gm. of reduced iron for an hour in a water-bath, with frequent agitation with 50 c.c. of a solution of mercuric chloride (5 per cent.); dilute the liquid after cooling with water to the measure of 100 c.c., and filter. To 10 c.c. of this filtrate are added 10 c.c. of sulphuric acid, and subsequently a solution of potassium permanganate until a permanent red coloration is produced. After decoloration ensues, which can also be effected by the addition of a few drops of alcohol, 1 gm. of potassium iodide is added. This mixture, contained in a closed vessel, is allowed to stand for half an hour at a temperature not exceeding 40° C., when after cooling not less than 16 c.c. of decinormal sodium, thiosulphate should be required to bind the liberated iodine.

The action of the mercuric chloride is to convert only the metallic iron into ferrous chloride; while the oxides remain unaffected, the permanganate converts the latter into ferric chloride. Power says that the solution of the permanganate should be exactly decinormal, the number of c.c. consumed would then agree precisely with the number of c.c. decinormal sodium thiosulphate, and thus afford an additional control for the accuracy of this method.—Pharm. Rundschau, N. Y., 1891, 216.

*Ferrum Reductum.*—W. J. Smythe examined ten commercial samples with the following results:

| | Modification of U. S. P. method. | P. G. method. | Remarks. |
|---|---|---|---|
| I | 82.0 | 82.7 | Gray, lustreless. |
| II | 80.8 | 81.1 | " " |
| III | 87.0 | 87.3 | " " |
| IV | 76.0 | — | " " |
| V | — | 73.0 | " " |
| VI | 56.4 | 55.2 | Hydrogen sulphide evolved. |
| VII | 30.6 | 29.8 | Brownish. |
| VIII | 28.4 | 29.1 | " |
| IX | — | 26.1 | " |
| X | 25.2 | — | Contained shining particles. |
| U. S. P. | At least 80.0 | | |

He finds that a brownish color indicates a low percentage of metallic iron. The method of the U. S. P. was modified by Smythe as follows: One gm. of the iron is digested with 4 gm. of iodine, 3 gm. of potassium iodide and 50 c.c. of distilled water in a stoppered flask for about six hours, then 100 c.c. of distilled water are added, and the excess of iodine determined by means of decinormal sodium thiosulphate, when it, of course, is easy to calculate the iron from the ferrous iodide. The method of the German Pharmacopœia was also modified: 0.25 gm. of the iron and 50 c.c. of a 5 per cent. solution of mercuric chloride are placed in a flask closed by means of a Bunsen valve and heated on a water-bath for one hour, the mixture was then cooled and diluted to 100 c.c. with distilled water. After the mixture had become clear, 50 c.c. of the fluid are transferred to a flask, 25 c.c. of dilute sulphuric acid added, and the mixture titrated with decinormal potassium permanganate, until a pink coloration is produced. When this color disappears, 2.5 gm. of potassium iodide are added, the flask closed and kept at a temperature of 40° C. for half an hour, and the liberated iodine determined with decinormal sodium thiosulphate.—Drug. Circ., 1892, 60.

*Ferri Sulphas Exsiccatus—Commercial.*—A. Leys has examined nine samples of commercial salt, and found respectively: 94.294, 93.886, 92.765, 91.236, 89.197, 87.158, 84.100, 76.455, 45.873 per cent. of ferrous sulphate. The U. S. P. calls for 97.5.—Drug. Circ., 1892, 42.

*Ferri Valerianas—Estimation of Iron.*—F. B. Power thinks that in view of its variable composition, depending on the process, the care with which it has been washed, and the temperature at which it has been dried, it would be best to assign no definite chemical formula to this salt, but merely require that it should contain not less than 16, nor more than 21 per cent. of metallic iron. This would exclude any considerable admixture of ferric oxide, since the latter contains 70 per cent. of iron. Power estimates it iodometrically as detailed under Ferri citras, starting from 0.56 gm. of the salt.—Pharm. Rundschau, N. Y., 1891, 216.

## CHROMIUM.

*Chromium—Test.*—In most works on qualitative analysis it is directed that an insoluble chromate be tested for chromium by fusing it with sodium carbonate and nitrate, treating the fused mass with water, and adding acid to the yellow filtrate, when the color is changed to reddish-brown. L. W. McCay calls attention to the fact that during fusion a considerable quantity of alkaline nitrate will be formed, which dissolves with the chromate, and upon the addition of an acid splits up into a corresponding alkali salt and free nitrous acid, which latter is present in such quantities as to almost immediately reduce all the chromic acid to chromic oxide, and occasion a grayish-blue color, and thus is liable to mislead a beginner. Chem. News, 1892, lxv., 221.

*Chromium—Atomic Weight.*—C. Meineke has made a careful determination of the atomic weight of chromium by estimating (1) the quantity of silver and chromium in silver chromate and in silver chromate ammonia; (2) the quantity of oxygen in these two compounds; (3) the quantity of oxygen in potassium dichromate, and (4) the quantity of oxygen and of chromium in ammonium dichromate.

The *silver chromate ammonia* was prepared by treating an aqueous solution of pure silver nitrate with a solution of pure potassium chromate, and crystallizing the precipitate twice from hot ammonia; the silver chromate was obtained by evaporating an aqueous solution of the ammonia compound. The potassium dichromate was prepared from pure potash and pure chromic acid. The ammonium dichromate was obtained by repeatedly recrystallizing the purest commercial salt; it contained 0.2 per cent. of potash. The silver and the chromium were estimated by placing in a porcelain crucible, covering with dilute alcohol, and digesting with hydrochloric acid. The silver chloride was washed by decantation until free from chromium, dried, and weighed in the original crucible; from the filtrate and washings the silver was precipitated with hydrogen sulphide and weighed as sulphate. The oxygen determinations were made by a modification of Zulkowski's iodometric method (J. prakt. Ch., ciii., 351). Taking the atomic weights of O, Cl, and Ag as 15.96, 35.37, and 107.66 respectively, the atomic weight of Cr, calculated from the proportion $4AgCl : Cr_2O_7$, was found to be 51.99 (max., 52.12; min., 51.92,) as the mean of nine experiments. All the weights from which the above results are calculated are reduced to 0° C. and a vacuum.—Journ. Chem. Soc., Aug. 1891, 882; from Annalen, cclxi., 339–371.

*Chromium—Action of Heat upon the Solutions of the Salts of the Sesquioxide.*—A. Recoura concludes that within the limits of concentration in which he has been able to operate, dissolved chromium sesquisulphate is split up completely under the influence of heat into free sulphuric acid and a soluble basic sulphate of a perfectly definite composition, $2Cr_2O_3,5SO_3$. It is derived from 2 mols. of sulphate, which lose 1 mol. of acid, and it contains a modified oxide which is unable to fix a further quantity of acid. This modified sesquioxide cannot exist in a free state.—Comptes rendus, cxii., 1439, through Chem. News, July 10, 1891, 25.

*Chromium Sesquisulphate—Green.*—A. Recoura finds that either on producing chromium sulphate in presence of a very small quantity of water, or by partially dehydrating by heat the crystalline violet sulphate, we obtain a sulphate which is green, solid, and crystalline, possessing properties quite distinct from those of the violet sulphate. If the violet salt is placed in contact with dehydrating liquids, such as $SO_4H_2$ or $NO_3H$, it becomes green; however, when this green sulphate is freed from the dehydrating liquid it quickly returns to the violet condition.—Chem. News, 1892, lxv., 11, from Comptes rend., 1891, cxiii.

——— W. N. Hartley confirms the observations of Recoura, and states that the action of heat on the violet hydrated compounds of chromium is not simply a dissociation of water molecules, or of acid from base, but a true decomposition resulting in the production of a different class of salts with different generic properties.—Chem. News, 1892, lxv., 15.

——— This solid green sulphate, although having the same composition as the violet sulphate, $Cr_2O_3,3SO_3 11H_2O$, must have a constitution completely different. On decomposing this salt with an alkali, there is precipitated, not the normal chromium hydrate, but a hydrate which takes up only 2 mols. of water.—Chem. News, 1892, lxv., 36, from Comptes rendus.

——— A. Recoura found, on combining his "green chromium sulphate" with an equivalent quantity of sulphuric acid or of any metallic sulphate, that compounds are formed in which all the sulphuric acid is masked, whilst on the contrary, the combined metals may be shown by the ordinary reagents. He therefore considers these compounds as salts of a peculiar acid $(Cr_2 4SO_4)H_2$, which he proposes to call *chromosulphuric acid.* In order to obtain this acid in the solid state, he reduces chromic acid with alcohol in the presence of a suitable quantity of sulphuric acid; for the details of the manipulation and of the salts reference must be had to the original article.—Chem. News, 1892, lxv., 137, from Comptes rendus, 1892, cxiv., 477.

*Chrome-blue—Artificial.*—Jules Garnier obtains a blue glass by fusing together potassium chromate (bichromate ?—Rep.) 48.62 parts, fluor spar 65 parts, and silica 157 parts. A glass of a very fine blue is produced, covered by a thin scale of metallic chromium, which can be collected. The color is probably due to an inferior oxide of chromium.—Drug. Circ., 1892, 132.

*Chromic Acid—Explosive Compound with Baryta.*—By the action of baryta water upon chromic acid in the presence of oxygenated water is formed a precipitate of a chamois color, which when dry detonates violently when struck or heated. Its composition is possibly $BaO_2CrO_8$.—E. Péchard. Chem. News, July 24, 1891, 49, from Comptes rendus, cxiii., 1891, 39; Am. Journ. Pharm., 1891, 596.

*Chromates.*—See under the respective bases.

## NICCOLUM.

*Nickel—Volatility.*—A. Schuetzenberger points out that on reducing anhydrous nickel chloride at a dull red heat with hydrogen gas, the hydrochloric acid escaping from the reduction-tube carries along with it sensible quantities of metal in the form of a volatile product. It is not a case of mechanical transportation, but probably a nickel hydrochlorate. Iron and zinc behave similarly.—Chem. News, 1891, lxiv., 84, from Comptes rendus, 1891, cxiii., July, 177.

*Nickel Carbon Oxide—Properties.*—This volatile compound, discovered a couple of years ago by Ludwig Mond, is a colorless, mobile, highly refracting liquid of a characteristic odor. It is soluble in a large number of organic liquids, and boils at 43° C. (751 mm. pressure) without decomposition, evaporating rapidly at ordinary temperature in current of other gases. The sp. gr. at 17° C. is 1.3185; it solidifies at —25° C., forming needle-shaped crystals. It is very poisonous. The fact that under ordinary circumstances nickel alone is acted upon when a mixture of this metal with any other metallic or mineral substances is treated with carbonic oxide gas, led Mond to ascertain whether it would not be possible by means of carbon oxide to extract nickel directly from its ores. On experimenting he found that the process is entirely successful on a laboratory scale, and he even found it possible to produce directly from the nickel carbon oxide gas, articles of solid nickel, and to plate goods with it.—Chem. News, 1891, lxiv., 108; Am. Drug., 1891, 294.

### COBALTUM.

*Cobalt—Atomic Weight.*—In order to ascertain the discrepancies in the determinations of the atomic weight given by chemists of recognized standing, Hugo Remmler attacked a large specimen of the purest cobalt to be procured by fractionation. He digested cobaltic hydroxide for about nine months in aqueous ammonia, obtaining twenty-five extracts, the atomic weights of twenty-four of which, after purification, were determined. The values obtained ranged from 59.531 to 58.299. The atomic weights not increasing nor decreasing progressively, seems to point to the conclusion that cobaltic hydroxide is either a compound or a mixture of two hydroxides, unequally soluble in the liquids employed. The author's results, therefore, seem to agree with the result of Krüss and Schmidt, that cobalt, as ordinarily purified, contains two components of different atomic weights. —Inaugural dissertation, Erlangen, through Chem. News, July 3, 1891, 10.

*Cobalt Salts—Artistic Use.*—If window panes or wall paper are painted with any of the following solutions: (1) Chloride of cobalt, 1; gelatine, 10; and water, 100; (2) Chloride of copper, 1; gelatine, 10; and water, 100; (3) Chloride of cobalt, 1; gelatine, 20; water, 200; oxide of nickel, 65; chloride of copper, 25, they will be colorless in damp weather, but in clear weather, solution No. 1 will give a blue color; No. 2, yellow; and No. 3, green.—Rueckert. Canadian Ph. J., July 1891, 190, from Annal. Chem.

### ZINCUM.

*Zinc—Behavior to Acids.*—According to J. M. Warren, the insolubility—respectively, difficult solubility—of chemically pure zinc (and other metals) in acids is due to the metal becoming enveloped in an atmosphere of condensed hydrogen as soon as it is immersed into the acid, which prevents the further action of the acid under normal conditions. The correctness

of this view seems proven by the fact that in vacuo much more zinc is dissolved in the same time and by the same amount of diluted sulphuric acid than at ordinary pressure; likewise the solubility of the zinc increases slowly from 0° to 98° C., but as soon as the boiling temperature of the diluted acid is reached, the increase rises suddenly. Under ordinary circumstances about twice as much zinc dissolves at 98° C. as at 18° C., but at 100° C. 13 times as much as at 98° C. The solubility of zinc will be considerably increased if chromic acid, hydrogen peroxide, or any other strongly oxidizing substance is added to the diluted sulphuric acid, because the hydrogen enveloping the metal is at once oxidized to water, and thereby keeps the metal easily accessible.—Chem. Zeitg. (Rep.), July 1891, 183, from Ber., xxiv., 1785; Am. Jour. Pharm., 1891, 503.

*Zinc—Titration.*—F. Moldenhauer determines the final point in the titration of zinc by means of potassium ferrocyanide in an ammoniacal solution, by the use of a copper sulphate as an indicator. He draws a narrow longitudinal streak on white and smooth filter-paper by means of a hair pencil saturated with a 4 per cent. solution of copper sulphate, and dries it quickly over a flame. For use, a drop of the precipitated solution of zinc is let fall upon the white end of a slip of this paper, when the liquid quickly will reach the blue streak. If an excess of ferrocyanide is present there appears on the blue boundary line a red or reddish line; if the excess is very slight the reddish color does not appear immediately; it appears, however, very quickly if there is an excess of 0.1 to 0.2 c.c. of a decinormal solution of ferrocyanide in 100 c.c. of ammoniacal water. The strength of the ferrocyanide solution is so adjusted that 1 c.c. corresponds to 0.005 gm. of zinc.—Chem. News, 1891, lxiv., 150, from Chem. Zeitg.

*Zinc—Estimation.*—H. E. Hoelke having for several reasons become dissatisfied with the usual method—precipitating with sodium sulphide—of previously established titre, using nickelous chloride as indicator, has devised the two following methods as being highly satisfactory:

(1) The Zn solution, if acid, is rendered slightly alkaline, and precipitated with a slight excess of the sodium sulphide. The precipitate is well washed on a filter, and then thrown into a solution of ferric sulphate, and some sulphuric acid added, when the following reaction takes place:

$$ZnS + Fe_2(SO_4)_3 = ZnSO_4 + 2FeSO_4 + S.$$

Pour it all into a graduated cylinder, fill up to 100 c.c., shake well, and after settling pour off (or filter) 50 c.c., and determine the $FeSO_4$ with $KMnO_4$, and multiply the result by 2. Every 112 units of Fe found represents 65 of Zn.

(2) Instead of ferric sulphate, the author also uses argentic nitrate (a measured quantity of known strength):

$$ZnS + 3AgNO_3 = Zn(NO_3)_2 + Ag_2S + AgNO_3.$$

Using a titred solution of KCNS, and as indicator a drop of $Fe_2(SO_4)_3$, which is Volhard's method, it will be found necessary to heat the ZnS with the silver solution, to make sure of the complete absorption of the sulphur. The excess of silver found is to be deducted from the whole quantity used, representing the quantity combined with the sulphur. The proportion is 216 Ag = 65 Zn.—Am. Drug., 1891, 281.

*Zinc—Volumetric Estimation.*—L. Blum estimates zinc in a solution containing, besides iron, manganese, alkaline earths, and magnesia, by an ammoniacal solution of potassium ferrocyanide. The liquid to be examined is first treated with bromine water, then iron, manganese, and alkaline earths are precipitated with a solution of ammonium carbonate, ammonium chloride, and ammonia, leaving zinc and magnesia, of which only the zinc is precipitated by an ammoniacal solution of potassium ferrocyanide.—Chem. Zeitg., Rep., 1892, 132, from Zeitschr. Analyt. Chem., 1892, 60.

*Zinc—Volatility on Treatment with Hydrochloric Acid.* See under *Nickel.*

*Zinc—Writing.*—Immerse the zinc for a moment in dilute sulphuric acid, rinse, and wipe dry. Then with an ordinary steel pen use butter of antimony as a writing fluid.—Drug. Circ., 1891, 275; from Chem. Zeitg.

See also under *Ink.*

*Zinc Carbonate—Precipitated.*—Charles O. Curtman thinks it best for the Pharmacopœia to give a working formula for the preparation of precipitated carbonate of zinc, in view of the great diversity existing among the commercial articles sold under that name; as an alternative Curtman proposes that the present chemical formula be omitted, because the great majority of the specimens found no longer pretend to conform to it, but instead of containing 45.69 per cent. of carbonate contain much less, and a proportionate increase of zinc hydrate. Curtman points out that much depends on the process followed. Mohr's process will, with proper precautions, furnish the officinal article. The chemical reaction requires 5 molecules each of the crystallized salts, 1433.20 parts of crystallized sulphate of zinc, and 1427.25 parts of crystallized carbonate of sodium, but in order to obtain the proper salt it is necessary that the sodium salt be present in slight excess. One part of sodium carbonate is dissolved in six parts of boiling water and kept at a boiling heat, while a concentrated solution of zinc sulphate is poured into it, with constant stirring, in such small quantities at a time that the boiling is not interrupted, so that the product may become pulverulent, and not flocculent or gelatinous. This slow addition is to be continued until the sodium carbonate is nearly, but not quite, decomposed, requiring about equal weights of both salts. After depositing, the supernatant water is decanted, and the precipitate of basic zinc carbonate again boiled for some time with water. After cooling,

throw the precipitate on a filter and wash with cold water, and finally dry at a temperature not exceeding 50° C. (122° F.).

Merely a slight deviation from the directions, the use of a little too much zinc sulphate, so that the alkaline reaction is not maintained to the end, the interruption of the boiling, and especially a too high heat in drying, will give a salt containing less carbonic acid. Both the British and the French Pharmacopœias use an excess of sodium carbonate, respectively, 10½ and 11 parts to 10 parts of the zinc sulphate.

The amount of water used in making the solutions gives rise to fluctuations in the relative proportions of the carbonate and the hydrate of zinc; on the other hand a great excess of sodium carbonate leads to other irregularities. Not only is there liability to the formation of the double salt, $8ZnCO_3.3Na_2CO_3+8H_2O$, which the ordinary mode of washing will not remove, but there may be excess of undecomposed sodium carbonate retained, while protracted washing with boiling water expels carbonic acid. —Pharm. Era, 1892, 230.

*Calamine—Of Commerce.*—D. B. Dott has examined several samples of calamine and found all of them to be contaminated with barium sulphate, the worst sample containing 92.10 per cent. and the best 29.17 per cent.; two of the samples did not contain zinc in any form, the best contained 66.90 per cent. Calcium carbonate was sometimes present in considerable quantity. He states that it would be better to substitute oxide of zinc for it; if necessary, the flesh tint might be given to it by the addition of sufficient of ferric oxide.—Chem. Drug., February 1892, 296.

*Chloride of Zinc.*—Prof. Lannelongue has proposed to use injections of chloride of zinc in tuberculosis.—Pharm. Jour. and Trans., Aug. 1, 1891, 82; from Lancet, July 11, 1891, 94.

*Chloride of Zinc—For Perspiration of the Feet.*—Dr. Wincgradoff advises the application of a 5-per-cent. solution, after washing the feet in tepid water; after a few minutes wash off.—Am. Drug., 1891, 198, from Lancet.

*Zinc Nitrate—Basic.*—J. Riban caused nitric acid, diluted with an equal volume of water, to act upon pure zinc. There is first formed neutral zinc nitrate, but if boiled in presence of an excess of the metal there is produced a white precipitate of a basic salt, which is filtered off. The filtrate, as it gradually cools, becomes turbid, and yields successive deposits, which are separated by filtration. The first portions deposited are generally formed of rhombic tables and needles; the subsequent deposits consist of very short needles grouped in stars. The composition of the latter portion is $6ZnO.N_2O_5,8H_2O$; a compound with $7H_2O$ may also be obtained.—Chem. News, 1892, lxv., 311; from Comptes rendus, 1892, cxiv.

*Zinc Sulphate for Bedbugs.*—Meidl recommends a solution of 2 parts of

sulphate of zinc in 100 parts of water, to which solution sufficient alcohol is added to render it turbid. Apply with a brush.—Pharm. Post, 1892, 394.

*Zinc Sulphide—Preparation of the Pigment.*—Zinc sulphate or chloride previously freed from iron, manganese, etc., is precipitated by an alkaline or alkaline earthy sulphide, the precipitate dried, ignited at a red heat, thrown while hot into water, levigated, washed, dried, and finely powdered. It is an excellent pigment for whiteness, body, and covering power, and is not discolored by hydrogen sulphide, but it blackens in sunlight, recovering its original whiteness in the dark. After many trials J. Cawley succeeded in preparing a pigment which as a rule does not darken: boiling hot, concentrated solutions of the zinc salt and barium sulphide are used; the precipitate is mixed with 0.5 per cent. of freshly precipitated magnesium hydroxide and with sodium chloride, filtered, dried, and mixed with 3 per cent. of ammonium chloride before ignition.—Jour. Chem. Soc., 1891, 881; from Chem. News, lxiii., 88.

*Zinc and Mercury Cyenide.* See under *Cyanogen Compounds.*

## BISMUTHUM.

*Bismuth—Test.*—To the solution add a slight excess of soda solution, when a white precipitate of hydrated bismuthic oxide is obtained. To a solution of stannous chloride, contained in another test-tube, add an excess of soda solution, which will dissolve the precipitate of hydrated stannous oxide first formed. Transfer the white bismuthic oxide to a porcelain capsule, and pour upon it a portion of the stannous solution, when, on stirring, very soon a dense, black precipitate will be noticed, being an oxide of bismuth ($Bi_2O_2$). This test is stated to have originated with Bunsen.—Chem. News, 1892, lxv., 53.

*Bismuth—Removal of Copper.*—Instead of the costly and tedious wet-process previously used for freeing bismuth from the small but detrimental trace of copper so frequently accompanying it, E. Mithey stirs a small proportion of sodium monosulphide into the fused alloy at a temperature just above the melting-point of the sulphide. By this means 90 per cent. of the bismuth can be obtained entirely free from copper, the remaining 10 per cent. (skimmings), which contain the copper, being worked up again.—Chem. and Drug., July 11, 1891, 40.

*Bismuth—Contamination with Lead.*—Classen furnishes further proofs for the presence of lead in metallic bismuth of commerce. In a sample of what was sold as suitable for scientific purposes he found sufficient lead to obtain 10 gm. of lead chloride from 500 gm. A so-called "purissimus" contained, besides lead, 1.56 per cent. of copper and 0.45 per cent. of iron. Classen states that the melting point gives a fair indication of the purity or impurity of the metal. Bismuth obtained by electrolysis

and consequently pure, fuses at 264° C.; Trommsdorff's "absolutely pure" at 265–266° C.; Trommsdorff's "purissimus" at 271.8–273° C.; Schering's "purissimus" at 269–270° C.—Apoth.-Zeitg. (Rep.), 1891, 121, from Jour. prakt. Chem., 1891, 411.

*Bismuth—Separation from Lead.*—The volatility of bismuth chloride as contrasted with lead chloride has previously been utilized for the separation of the two metals. According to Vogel, the most suitable temperature is between 360° and 370° C., but the mixture must not be heated too strongly, in order not to drive off lead chloride; if too low, bismuth chloride will be left behind. W. Remmler obviates the difficulty by heating the mixture in the vapor of boiling sulphur. In a test tube, 20 cm. in length and 3–4 cm. in diameter, are placed about 20 gm. of sulphur. Into this tube is fixed a narrower test-tube, about 16 cm. in length; into the second tube a smaller test tube, about 4 cm. in length, is hung. The substance to be analyzed is introduced into the innermost tube, and a current of dry chlorine is passed down during the heating. By experiment it was found that the lead sulphide (in analysis the metals are generally obtained as sulphides) was converted better into chloride by first heating it in a xylol-boiler. Remmler therefore first boils the sulphides for one hour in the xylol-boiler, and then for one hour in the sulphur-bath, passing, of course, a current of chlorine during the boiling. In a mixture containing 42.17 per cent. lead, he found by this method 42.09 per cent.—Chem. News, 1892, lxv., 28, from Ber., 1891, xxiv., 3554.

*Bromide of Bismuth—Preparation.*—Victor Meyer prepares it by gradually adding finely powdered bismuth to bromine contained in a retort. The combination takes place slowly, several days being required at the ordinary temperature to complete the reaction. The mixture is then distilled, bromine and bromide of bismuth passing over, and a considerable amount of bismuth remaining behind. The latter is again powdered and treated in the same manner. The product must be distilled several times, and is finally obtained as a handsome orange-red mass, of a radiately crystalline form. It can be boiled without decomposition for many hours. V. Meyer makes use of the high boiling point of this salt (453° C.) for a bath. —Am. Drug., Aug. 1891, 237, from Annalen, cclxiv., 122.

*Bismuthic Acid—Composition.*—G. André arrives at the same results as Muir and Carnegie (see Proceedings 1887, xxxv., 227) that it is exceedingly difficult to obtain a bismuthic acid of constant composition. The combination of potassium with bismuthic acid is never complete, and does not allow us to reach the composition of a neutral salt.—Chem. News, 1892, lxv., 11, from Comptes rend., 1891, cxiii.

*Bismuth Gallate (Dermatol).*—See under *Gallic Acid.*

*Bismuth Salicylate.*—See under *Salicylic Acid.*

*Bismuth Benzoate.*—See under *Benzoic Acid.*

*Bismuth and Pepsin.*—See under *Pepsin.*

CUPRUM.

*Copper—Atomic Weight.*—T. W. Richards, starting from a pure solution of cupric bromide (the bromine being determined by silver) gives the following figures from eight trustworthy determinations (assuming the ratio Ag : Br 108.00 : 80.007) : 63.645, with a maximum of 63.664, a minimum of 63.628, and a variation from the mean of ± 0.18. If lower values for Ag are accepted, the following ratios are obtained: Ag : Cu = 107.93 (O = 16) : 63.60; Ag : Cu = 107.675 (Clarke) : 63.45; Ag : Cu = 107.66 (Meyer and Seubert) : 63.44; Ag : Cu = 107.06 (O = 15.87) : 63.9.—Journ. Chem. Soc., July 1891, 805, from Chem. News, lxiii., 20, 34, 43.

*Copper—Atomic Weight.*—Th. W. Richards was induced to revise the investigations of previous chemists by the fact that the quantity of copper necessary to replace the silver in solutions of silver nitrate indicated a higher atomic weight than hitherto accepted. Starting from sulphate of copper Richards found the atomic weight to be 63.605, and starting from the oxide he obtained 63.604 (O = 16); which is 63.44 for (O = 15.96)—Chem. Zeitg., Rep., 1892, 165, from Zeits. anorgan. Chem., i., 187; Chem. News, 1892, lxv., 236, 244, 265, 270, 281, 293, 302.

*Copper—Reactions.*—Deniges states that pyrogallic acid and a cold solution of neutral sulphate of sodium yield with small quantities of copper salts a blood-red color. One c.c. of a solution of cupric sulphate (1 : 3,000,000) still shows the reaction. He has improved upon his bromide reaction (Proceedings 1889, xxxvii, 559) by directing to evaporate the solution to be analyzed to dryness, and adding to the calcined residue one drop of a 5 per cent. solution of potassium bromide. On evaporating again to dryness a characteristic violet zone of anhydrous copper bromide appears.—Am. Journ. Pharm., 1892, 77, from Monit. Pharm., 1891, 1006.

*Copper—Precipitation by Iron.*—According to J. C. Essner, the structure of the iron used in reducing copper exerts a marked influence on that of the copper obtained. Ordinarily very mixed qualities of scrap iron are employed, and the reduced copper occurs in powder, grains and filaments, which can not readily be washed free from the mud of ferric hydroxide formed. By selecting the iron to be used, it is possible to obtain the copper in a fibrous or granular condition, which admits of ready washing. The occurrence of the mud of ferric hydroxide is due to the formation of a basic ferric sulphate $Fe_2(OH)_4SO_4$, and can be prevented by the addition of a little sulphuric acid.—Jour. Chem. Soc., Abstr., 1892, 276; from Bull. Soc. Chim., vi., 147.

*Copper,* detection in *Galenical Preparations.* See under "General Pharmacy."

*Copper Hydride.*—The new compound has nothing in common with the compound discovered by Wurtz, which is formed in the cold and destroyed entirely at about 60° C. Leduc's hydride is produced at a dull red heat

by the direct union of its elements, and presents mere traces of dissociation at a cherry-red heat. It is a body of a fine hyacinth red, which covers the metal. It appears certain that the hydrogen is really combined with and not dissolved in the metal.—Comptes rendus, cxiii., 1891, 71, through Chem. News, July 31, 1891, 60.

*Copper Bromide—Preparation of Pure.*—T. W. Richards obtained his solution of pure cupric bromide by the action of a slight excess of pure bromine on pure copper in the presence of water. After completion of the reaction, the excess of bromine was expelled by gentle evaporation to dryness in a glass dish, the nearly normal cupric bromide dissolved in a small amount of water, and the solution filtered through asbestos. The filtrate, barely acidulated with pure hydrobromic acid, was concentrated to syrupy consistency, and left undisturbed in a vacuum for 36 hours. On agitation and cooling with ice, the odorless, black, supersaturated solution immediately crystallized to a mass of brownish-green needles, which were collected on a perforated crucible, and washed three times with a very little water.—Jour. Chem. Soc., July 1891, 805; from Chem. News, lxiii., 20, etc.

*Cuprous Chloride, Bromide and Iodide—Preparation.*—A. Angeli prepares cuprous chloride by gently warming a mixture of solutions of cupric sulphate and sodium hypophosphite, acidified with hydrochloric acid, when the chloride speedily separates. The cuprous bromide and the iodide may be prepared in a similar manner.—Jour. Chem. Soc., 1892, lxi., Abstr., 305; from Gazzetta, xxi., ii., 258.

## PLUMBUM.

*Lead—Action of Magnesium.*—The oxide is reduced to metal with a violent explosion and evolution of light.—C. Winkler. Journ. Chem. Soc., 1891, 802, from Ber., xxiv., 873.

*Lead Water—Always Clear.*—F. Frischmann makes a suggestion respecting the keeping of lead water (made with distilled water), which may be applied to many liquid preparations which suffer from contact with the atmospheric air. It is simply to draw the contents by means of a tubulature at the bottom, or by means of a syphon.—Pharm. Post, 1892, 207.

*Lead Water with Magnesium Acetate.*—See under *Liquor plumbi subacetatis*.

*Lead Tannate.*—See under *Tannic acid.*

*Lead in Bismuth.*—See under *Bismuth*.

## THALLIUM.

*Thallium—Estimation.*—M. H. Baubigny, after pointing out the errors of preceding analysts, gives the following method: The thallium is precipitated in heat by an excess of potassium iodide in a neutral solution,

so that the liquid after precipitation may still contain 1 per cent. of potassium iodide. The precipitate is transferred to a filter, washed with a 1 per cent. solution of potassium iodide to remove foreign salts, then with alcohol (80 per cent.) and dried. For the details the original article must be consulted.—Chem. News, 1891, lxiv., 239, from Comptes rendus, 1891, cxiii.

## STANNUM.

*Tin—Easy Reduction of Ores.*—J. S. C. Wells finds that the reduction of tin ores can be accomplished in a much shorter time than with the ordinary methods by nascent hydrogen. The ore is heated in a test-tube with a few pieces of zinc and some dilute hydrochloric acid; an addition of a small piece of platinum (foil, etc.) will materially hasten the reduction. It will be necessary, of course, to shake the tube frequently.—Chem. News, 1891, lxiv., 294.

*Tin—Action of Magnesium.*—The oxide is violently reduced to metal with evolution of light and explosion.—C. Winkler, Journ. Chem. Soc., 1891, 802, from Ber., xxiv., 873.

*Canned Goods—Contamination with Tin.*—H. A. Weber examines for tin as follows: The contents of the can are well shaken, and 50 gm. taken out, dried and incinerated in a porcelain capsule. The residue is treated with hydrochloric acid, evaporated to dryness and extracted with acidulated (HCl) water, thrown on a filter, and washed. After drying, the filter with contents are incinerated, and again treated with hydrochloric acid, as before; and from the solution the tin is precipitated by hydrogen sulphide, and estimated as stannic oxide. Weber found in one case as much as 444 mgm. to the kilo.—Apoth.-Zeitg., 1892, 215.

*Putty Powder—Composition.*—W. Duncan states that the commercial putty powder is not a more or less impure oxide of tin, but might with more propriety be described as oxide of lead contaminated with oxide of tin, and instances the following analyses which represent putty powder, as usually found: $SnO_2$ 26.74, PbO 64.03, $Fe_2O_3$ 0.88, CaO 1.62, MgO 5.43, $H_2O$ 0.30, $CO_2$ 0.65.—Pharm. Jour. Trans., Dec. 1891, 523.

## TUNGSTEN (WOLFRAM).

*Wolfram (tungsten)—Uses.*—Experiments of late years have proved that the addition of a small quantity of tungsten to the fine steel used in gun-making renders the latter metal wonderfully elastic, so that the steel tube will expand under the tension of firing and contract again to its normal size a great many times before the quality of the metal is in any way impaired. Thus, from being a mere curiosity in the laboratory, it has now acquired considerable value. The richest deposits are found in Otago, New Zealand, where it occurs as tungstate of calcium.—Chem. and Drug., July 11, 1891, 38.

MOLYBDENUM.

*Molybdenum Vanadates.*—The experiments of C. Friedheim make it probable that the molybdovanadates can be considered as double salts like the tungstovanadates. He further discusses the constitution of salts of complex acids and double salts in general.—Jour. Chem. Soc., Aug. 1891, 884; from Ber. xxiv., 1173–1184.

VANADIUM.

See above.

TITANIUM.

*Titanium—Action of Magnesium.*—Titanic anhydride when heated with magnesium is not reduced to titanium, but titanium monoxide and magnesium titanate are produced; the titanide is not obtained.—W. C. Winkler, Journ. Chem. Soc., July, 1891, 802; from Ber., xxiv., 873–899.

ANTIMONIUM.

*Antimony—Assay of Ores.*—The assay of ores of antimony by the dry process is usually accompanied with loss, from 8 to 20, and sometimes 30 per cent. Ad. Carnot recommends a wet process, which in principle consists in dissolving the antimony in hydrochloric acid, precipitating it with tin, and weighing it in the metallic state.

(1) *Sulphuretted Ores.*—Sufficient of the ore to represent about 1 gm. of metallic antimony (generally from 2 to 5 gm.) is subjected to the action of 50 to 60 c.c. of strong hydrochloric acid by heating it in a sand-bath, but not up to ebullition, so as to avoid loss by projection. The acid solution is poured off and replaced by a new quantity of acid and heated again; this is repeated with a third quantity of acid, adding 1 or 2 drops of nitric acid; then wash the insoluble gangue with diluted acid. The mixed liquids are filtered, a piece of thick tin-foil introduced, and the whole heated to 80° or 90° C. The precipitation begins at once, and for 1 gm. of antimony it is completed at the end of 90 minutes. The precipitate is washed with dilute hydrochloric acid to remove tin salts, etc. The washing is then finished with hot water and alcohol. After drying at 100° C., weigh.

(2) *Oxidized Ores.*—The oxides are best converted into sulphides by heating them very gently in an atmosphere of hydrogen sulphide; afterwards proceed as before.

(3) *Ores Containing Iron, Lead and Zinc.*—Neither iron nor zinc occasions any difficulty. Lead will be deposited on the sheets of tin, and thus increase the weight of the antimony. Its presence can easily de detected by heating the metallic powder in a solution of sodium polysulphide (prepared by heating monosulphide with flowers of sulphur). The antimony rapidly dissolves, leaving the insoluble lead sulphide. Practically nine-

tenths of the weight of this residue may be considered as metallic lead.—Chem. News, 1892, lxv., 197; from Comptes rendus, 1892, cxiv., 587.

*Antimony Chloride—Solubility in Solutions of Sodium Chloride.*—H. Causse finds that solutions of $SbCl_3$, precipitated by an alkaline carbonate, may be rendered quite clear by the addition of an excess of sodium chloride.—Chem. News, 1892, lxv., 36, from Comptes rendus, 1891, cxiii.

See also under *Arsenic.*

TELLURIUM.

*Sodium Tellurate—Use.*—Combremaille recommends this at present very expensive chemical against night sweats in phthisis, but it is not likely to find much favor, owing to its garlicky odor and taste.—Am. Drug., July 1891, 221, from Gaz. Therapeut.

ARSENICUM.

*Arsenic—Direct Estimation.*—J. Clark makes use of the action of ferric salts upon sulphides. The results, obtained by distilling sulphide of arsenic with a concentrated solution of ferric chloride in concentrated hydrochloric acid, conducting the distillate into water, and precipitating with hydrogen sulphide, were perfectly satisfactory. This method is also applicable for the forensic detection of arsenic.—Chem. Zeitg. (Rep.), July 1891, 194; from Jour. Chem. Ind., 1891, x., 444.

*Arsenic—Forensic Detection.*—G. Ambuehl states that the method of Schneider and Fyfe, improved by J. A. Kayser, has given him better results than any other. The organic substances (contents of stomach, etc.) are introduced in the flask, and concentrated sulphuric acid poured slowly on them, so as to avoid as much as possible excessive heating. After the mass has been thoroughly cooled, fused chloride of sodium is added, and the flask heated, when the arsenic present will distil over as chloride.—Schweiz. Woch., 1892, 49.

*Arsenic—Bettendorff's Test.*—J. B. Nagelvoort prepares Bettendorff's test by boiling 5 to 10 gm. of pure tin with 25 c.c. of strong HCl, until nearly all the HCl is expelled; then add 5 c.c. of cold, strong 32 per cent. HCl to the residue in the flask, filter through asbestos, and use this freshly prepared stannous chloride as a reagent.--Pharm. Rundschau, N. Y., 1892, 85.

*Arsenic—Marsh's Test.*—O. Sautermeister calls attention to the unreliability of Marsh's test in examining iron for arsenic. See further under *Iron.*

*Arsenic—Improved Gutzeit's Test.*—J. B. Nagelvoort calls attention to the excellence of Klein's modification of Gutzeit's test. The latter test is based on the action of arseniuretted hydrogen upon a solution of nitrate which Klein modifies by substituting a layer of finely-powdered argentic nitrate between two layers of glass-wool for the argentic solution. In order

to guard against the deleterious action of illuminating gas and sulphur, Klein passes the hydrogen first over (or through) potassa and chloride of calcium. Nagelvoort improves upon all his predecessors by heating the diluted sulphuric acid, (1 : 5) to about 60° C., before pouring it gradually upon the zinc; this insures a steady and not too slow current.—Pharm. Rundschau, N. Y., 1891, 286.

*Arsenic—Mercuric Chloride as Test.*—Some years ago Flueckiger stated that by substituting mercuric chloride for silver nitrate in Gutzeit's test, the reaction would not be influenced by air or water (see Proceedings 1889, xxxvii., 566). P. Lohmann has found that the use of mercuric chloride has the great advantage that arsenic can be detected in the presence of antimony. A piece of filtering paper is moistened with a saturated alcoholic solution of mercuric chloride; after drying the spot is re-moistened, and this is repeated 4 or 5 times.

The action of both gases is as follows: Much diluted arseniuretted hydrogen gives a very distinct yellow coloration, or at least a faint but distinct reddish-yellow stain, moistened with water, the yellow coloration turns gradually darker; with alcohol the stain lasts for a while. Larger quantities of the gas give a reddish-yellow spot which turns grayish-brown on moistening with water. Much diluted antimoniuretted hydrogen does not act, larger quantities give a brown spot which is not altered by water, but on moistening with moderately strong alcohol it disappears almost at once. In the presence of both gases (diluted) the spot appears distinctly brown. The spot is cut out of paper, and 80 per cent. alcohol poured over it, which removes the excess of mercuric chloride, so that within a short time the peculiar yellow coloration due to arsenic appears. In the presence of a large excess of antimoniuretted hydrogen the spot is blackish-gray, and the arsenical color does not appear on treating the spot with alcohol.—Pharm. Zeitg., 1891, 748, 756.

*Arsenic—Relative Sensitiveness of Tests.*—Charles O. Curtman has investigated the above subject with the following results:

(1) *Hydrogen Sulphide*—0.01 mgm. in 1 c.c. of liquid produced after 2 minutes a faint yellow turbidity; with 0.001 mgm. it took 15 minutes to produce a very faint yellowish cloudiness; 0.0001 mgm. gave no reaction.

(2) *Hume's Test* (ammoniacal silver nitrate).—0.01 mgm. in 1 c.c. gave a faint yellow turbidity after 6 minutes; 0.001 mgm. gave no reaction.

(3) *Scheele's Test* (ammonio-copper sulphate).—0.1 mgm. in 1 c.c. gives a faint green precipitate; the limit is reached with 0.01 mgm., which shows scarcely perceptible turbidity.

(4) *Bettendorff's Test* (stannous chloride in concentrated hydrochloric acid).—0.1 mgm. in 1 c.c. produces a very faint brown turbidity; 0.01 mgm. gives no reaction.

(5) *Gutzeit's Test* (action of evolved hydrogen upon paper moistened

with a very concentrated silver solution).—0.001 mgm. in 1 c.c. produces a yellowish stain after 30 minutes, changing to light-brown on being moistened. The limit is reached with 0.0001 mgm., when after one hour a scarcely perceptible coloration is to be seen, which is rendered more distinct on moistening and then drying.

Gutzeit's test will show one part of anhydrous arsenious acid in ten million parts, and is therefore the best for reagents, but it is much too sensitive for testing pharmaceutical preparations, for which purpose Bettendorff's test is suitable. For details the readers are referred to the original article.—Pharm. Rundschau (N. Y.), 1891, 175.

*Arsenic—Separation from Antimony in Analysis.*—A method for the separation of arsenic from antimony, based upon the difference in volatility of the lower chlorides (reduction of the chlorides by ferrous chloride, and distillation with hydrochloric acid: arsenic volatilizes and antimony remains behind. See Proceedings, 1881, xxix., 272) was devised by E. Fischer, and improved by Classen and Ludwig, who substituted ammonio-ferrous sulphate for the less easily prepared ferrous chloride. In both methods the antimony must be determined gravimetrically, which consumes time; F. A. Gooch and E. W. Danner, desiring to determine the antimony by a rapid volumetric method, substitute hydriodic acid for the iron salt, which precludes volumetric estimation.

Their method may be briefly summarized as follows: To the solution of the oxides of arsenic and antimony, potassium iodide is added, and the mixture is then distilled with strong hydrochloric acid in a continuous current of hydrochloric acid gas. The rapidly cooled residual liquid is treated first with an excess of sulphurous acid, and then with iodine; after the addition of tartaric acid, and neutralization with sodium hydrate and bicarbonate, the antimony is finally treated with decinormal iodine, standardized against tartar emetic.—Chem. News, 1891, lxiv., 203.

*Arsenic and Antimony—Identification.*—The method of separating arsenic and antimony by passing hydrogen sulphide gas and then dry hydrochloric acid gas through the tubes in which the metals have been deposited, as in Marsh's test, has been modified by James T. Anderson so as to be conveniently applied in cases where it is desired to identify as arsenic or antimony metallic deposits on porcelain.

Add a drop of ammonium sulphide to the deposit, which converts the metal into the sulphide. Allow the excess of ammonium sulphide to evaporate, and with an ordinary mouth blowpipe blow across the open mouth of a bottle containing concentrated hydrochloric acid, directing the stream of gas into the porcelain dish upon the sulphide. If it be antimony sulphide, it will disappear entirely, while arsenic sulphide will remain unaffected in appearance.—Am. Drug., 1891, 334; from Jour. Am. Chem. Soc.

*Arsenious Oxide—Solubilities.*—E. Goodwin Clayton has investigated the solubility of arsenious oxide ($As_4O_6$) in cold and hot water and in alkaline solutions, with the following interesting results.

*Cold Aqueous Solution.*—Shaken with distilled water of 15° C., at intervals of half an hour, for four hours: 1 part in 847. At intervals of twenty minutes, during a period of six hours: 1 part in 372; sp. gr. of the solution, 1002.3. At frequent intervals during four days: 1 part in 101; sp. gr. of the solution, 1007.9.

*Hot Aqueous Solution.*—Boiled for one hour, the solution gradually cooled and allowed to rest for twenty-nine hours: 1 part in 45; spec. grav., 1017.7. Boiled for four hours: at 93° C., 1 part in 10½. A portion of the same solution allowed to cool and stand for one hour and a half: 1 part in 12. Left at rest for 45½ hours: 1 part in 30; sp. gr., 1025.4. Left at rest for 90 hours: 1 part in 31.

*Alkaline Solutions.*—Boiled with an excess of an aqueous solution of potash (1 : 10) for three hours. When measured hot: 1 part in 3. Allowed to stand for 24 hours: 1 in 7.—Chem. News, July 17, 1891, 27.

*Arsenic Tersulphide—Solubility in Water.*—When sulphuretted hydrogen is added to an aqueous solution of arsenious oxide the liquid becomes yellow from the formation of arsenic tersulphide, but no precipitate is formed. This is explained by the fact that the arsenic tersulphide is in the colloidal state, and may be present in that form, without precipitation, to the extent of 34.46 per cent. The addition of an acid immediately throws down the characteristic precipitate. In testing orpiment, it may be boiled with water, and the clear liquid then gives all the reactions of arsenic, but not those of a sulphide. This is due to a small percentage of arsenious oxide in the orpiment.—Pharm. Jour. Trans., Dec. 1891, 523.

*Sodium Arseniate.*—Under "liquor sodii arseniatis" the British pharmacopœia appears to use the salt with $7H_2O$; still, under "sodii arsenias," it mentions two salts, that with $12H_2O$ and that with $7H_2O$. George Coull points out that it by no means is indifferent which salt is used. That with $12H_2O$ contains 53.73 per cent. of water, and that with $7H_2O$ contains 40.38 per cent.; the solution made with the former salt would necessarily be weaker than required.—Pharm. Jour. Trans., April, 1892, 847.

*Arsenic, Detection in Iron.*—See under *Ferrum.*

*Arsenic in Black Phosphorus.*—See under *Phosphorus.*

## HYDRARGYRUM.

*Mercury—Vapor Pressures.*—Sydney Young, Journ. Chem. Soc., Aug. 1891, 629–634; Chem. News, July 1891, 21.

*Mercury—Purification.*—E. Wiedemann recommends a method for this purpose, which is so self-evident that it is a matter of surprise that it was not discovered long ago. It is merely an extension of the old pharmaceutical

way of purifying mercury by pressing it through chamois by squeezing the latter. The author merely bends up the end of a very long-necked funnel, and ties securely a piece of chamois over the end; the mercury poured into the funnel, will force itself out of the chamois as a fine shower, leaving all mechanical impurities behind.—Chem. Zeitg. (Rep.), 1891, 244, from Zeits. phys. chem. Unt.

*Mercury—Electrolytical Separation.*—Edgar F. Smith and Frank Muhr have succeeded in separating it nearly completely from platinum by electrolysis.—Chem. News, 1891, lxiv., 82, from Journ. Am. Chem. Soc., xiii.

*Mercury—Estimation in Animal Tissues.*—The tissue is minced, and heated with its own weight of 20 per cent. hydrochloric acid, in a flask with reflux condenser, until completely dissolved. After cooling to 60° C., a few gm. of potassium chlorate is added in small portions and the cooled and filtered liquid shaken with about 5 gm. of zinc-dust, to precipitate the mercury. The precipitate is well washed with water, soda, water and alcohol, then air dried, and the mercury distilled from a specially charged combustion-tube. In examining urine, it suffices to gently warm the urine with hydrochloric acid before adding the zinc dust.—F. Hofmeister, Journ. Chem. Soc., Aug. 1891, 962, from Zeits. anal. Chem., xxx., 258.

*Mercury—In Looking-glass Factories*—Hilger and v. Raumer find that, contrary to the usual notion, the amount of mercury contained in the air of such factories is very small. 1,000 litres were found to contain at most 0.89 mgm. of mercury, which would be little more than 0.00028 gm. in one cm. (about 35.32 cubic feet). Assuming 14 respirations, of 500 c.c. each, per minute, which would be 420 litres per hour, a workman would in eight hours inhale 0.0009 gm. of mercury (in vapor); and in one year with 44 working weeks, only 0.277 gm. The largest single medicinal dose of mercuric chloride is equal to 0.02 gm. of mercury.—Pharm. Centralhalle, 1891, 468.

*Mercuric Chlorides—Ammoniacal.*—When 1 part of yellow mercuric oxide is boiled with 5 parts of ammonium chloride dissolved in 17.5 parts of water, a small quantity of a crystalline precipitate forms on cooling; its composition varies, but approaches to $HgCl_2,2NH_3$. If the mother liquor is mixed with excess of ammonia, a white, curdy precipitate separates, and this, when washed rapidly by decantation and dried at 100° C., has the composition $N_2H_6HgCl_2 + NH_2HgCl$. By prolonged washing it is converted into a compound of the chloramide and the chloride, $NH_2HgO.HgCl$. If a cold solution of ammonium chloride, containing free ammonia, is mixed with mercuric chloride, the precipitate at first redissolves, but on continuous addition of mercuric chloride to the cold liquid, a white, curdy precipitate separates, and this, when dried at 100° C., has the composition $HgCl_2,NH_3$. The same product is obtained with a hot solution, provided that mercuric chloride is added in excess; it is decomposed by water with formation of chloramide.—G. Andre, Journ. Chem. Soc., Sept. 1891, 986, from Comptes rendus, cxii., 859–861.

*Mercuro-ammonium Salts.*—L. Pesci finds that the *so-called mercuro-ammonium* salts obtained as black insoluble powders upon the addition of water of ammonia to mercurous salts are *not* mercuro-ammonium salts, but *mixtures* of *metallic mercury* and *mercuri-ammonium salts;* the action of ammonia upon calomel is represented by the following equation: $2Hg_2Cl_2+4NH_3=NHg_2Cl,NH_4Cl+Hg+2NH_4Cl$; one-half of the mercury present in the mercurous salt being separated as metallic mercury. These results were discovered by treating the black precipitates with concentrated solutions of ammonium sulphate or nitrate containing some free ammonia, which dissolved the mercuric salt, leaving undissolved the metallic mercury.—Chem. Zeitg., Rep., 1892, 142, from Gazzetta.

*Mercuric Chloride as a Vesicant.*—Dr. Aubert uses compresses moistened with a one per cent. solution of this salt, and in 6 to 7 hours obtains a vesication analogous to that from cantharides.—Am. Journ. Pharm., 1892, 191, from Union pharm., 1892, 55.

*Mercuric Chloride—Peculiar Property.*—H. Borntraeger has noticed that on adding a few drops of a 10 per cent. solution of mercuric chloride to a flask containing zinc and diluted sulphuric acid, the evolution of hydrogen is stopped at once, even in the presence of platinic chloride. In the last case not even hot nitric acid is able to dissolve the formed mercury-platinum-zinc amalgam. Borntraeger thinks that this property might be used to coat zinc with a protective layer of amalgam.—Chem. Zeitg., Rep., 1892, 130, from Ph. Centralh., 1892, 167.

*Mercuric Oxychloride—Crystalline.*—J. Volhard obtains the oxychloride, $Hg_3O_2Cl_2$, by allowing a cold saturated solution of mercuric chloride, mixed with sodium acetate, to stand for some days, when the salt crystallizes.

*Mercurous Chloride—New Formation.*—Ettore Barbi had occasion to pass hydrogen into a concentrated aqueous solution of mercuric chloride, when he noticed that this became cloudy at first, and afterwards deposited a white precipitate, which was found to be calomel. The reaction evidently takes place after the following scheme: $2HgCl_2+H_2=Hg_2Cl_2+2HCl$. —Am. Drug., 1891, 344, from Boll. Farm., 1891, 547.

*Green Mercurous Iodide—Reaction.*—Charles Caspari, Jr., calls attention to a not sufficiently known reaction between the green mercurous iodide with soluble metallic iodides, whereby is formed red mercuric iodide and metallic mercury; if it now be recollected that the dose of the red iodide is $\frac{1}{8}$ to $\frac{1}{16}$ grain, while that of the green iodide is ½ to 1 grain, the danger of such combinations becomes apparent. This remark was prompted by a prescription containing mercurous iodide and syrup of ferrous iodide.—Pharm. Review, 1892, 34.

*Mercuric Pyroborate.*—($HgB_4O_7$).—A solution of 54 gm. of mercuric chloride in 1,000 gm. of water is poured in a thin stream into a solution of 76 gm. of sodium pyroborate, in the same quantity of water, and the brown precipitate washed until all the chlorine has been removed; it is dried in

a dark place. The borate of mercury is insoluble in water, alcohol and ether.—Pharm. Post, 1892, 156.

*Mercurial Salts and Compounds Containing Iodine—Action of Light.*— In continuation of his previous researches on the action of light upon a mixture of iodoform and calomel (see Proceedings 1891, xxxix., 563) Geo. Roe has investigated the behavior of other mercurial salts with iodine compounds, and tabulated the results:

| Mixtures. | Seven days. | One month. | Six months. |
|---|---|---|---|
| Mercurous chloride with | | | |
| Sod. sozoiodol. | No change. | Scarlet. | Same. |
| Diiodosalicylic acid. | Darker. | Same. | Same. |
| Sulph. iodide (pink when mixed). | Iodine odor, red brown. | Same. | Lighter. |
| Cadmium iodide (yellow when mixed). | Grey, with light scarlet spots. | Same. | Color fading. |
| Silver iodide (yellow when mixed). | Darker. | Light scarlet spots. | Color fading. |
| Copper iodide (pink when mixed). | Grey. | Scarlet. | Nearly grey. |
| Lead iodide (yellow when mixed). | Darker. | Light scarlet. | Same. |
| Antimony iodide (brown when mixed). | Grey, changing to scarlet. | Same. | Caked together and covered with colorless crystals. |
| Iodoform. | Scarlet. | Same. | Fading, acicular crystals on bottle. |
| Iodoform and lard. | Scarlet, changing to brown. | Darker. | Lighter. |
| Iodoform and lanolin. | Brown. | Same. | Changing to scarlet. |
| Iodoform and vaselin. | Dark brown. | Black and spots of scarlet. | Same. |
| Green mercurous iodide. | Grey, changing to scarlet. | Large scarlet spots. | Same. |
| Iodol. | No change. | Changing to scarlet. | Same. |
| Ammonium iodide (light green when mixed). | Grey. | Black with scarlet spots. | Lighter. |
| Mercuric chlor. with iodoform. | No change. | Iodine odor, black spots on upper part of bottle. | Spots gone, acicular crystals take their place. |
| Mercury and chalk, iodoform. | Scarlet spots. | Same, with back of bottle black. | Becoming grey again. |
| Green mercurous iodide, iodoform. | Scarlet. | Same. | Same. |
| Mercurial ointment, iodoform. | Scarlet. | Darker. | Scarlet color fading. |
| Same with lanolin base. | Very slight change. | Same. | Same. |
| Ointment yellow oxide, iodoform. | Dark brown. | Scarlet and black. | Same. |
| Mercuric sulphate, iodoform. | Scarlet. | Same. | Color fading. |
| Mercuric sulphate, iodol. | No change. | Changing to scarlet. | Same. |
| Oleate of mercury, iodoform. | Green and scarlet. | Scarlet. | Same. |

The lanolin used was anhydrous.—Pharm. Jour. and Trans., Feb. 1892, 641.

*Amalgams.*—J. Schumann concludes from his investigations that solid amalgams consist of different crystalline modifications, some of which are stable at a given temperature and others unstable.—Jour. Chem. Soc., Sept. 1891, 986; from Annalen (2), xliii., 101–125.

*Mercury Thymolacetate.* See under *Thymol.*

*Mercuric Chloride Paper.* See under *Test Paper.*

*Mercuric Succinimide.* See under *Succinic Acid.*

*Mercury and Zinc Cyanide.* See under *Cyanogen Compounds.*

## ARGENTUM.

*Silver—Allotropic Forms.*—M. Carey Lea gives the following reactions of the gold-like allotropic silver, C, noticed in a former article (see Proceedings, xxxviii., 568). It behaves in a peculiar manner with strong acids. Hydrochloric acid has no action on normal reduced silver, but when it is added to the allotropic silver some silver chloride is always formed, although the amount is small because of the immediate conversion of the silver into the ordinary form. Sulphuric acid diluted with 50 volumes of water has no action on ordinary silver, but converts the gold-like modification into the normal form, and dissolves a small quantity. When mixed with 4 vols. of water, and allowed to cool, it converts the gold-like form, in a few seconds, into the intermediate modification described below; if the acid is mixed with 2 vols. of water and applied hot, the metal changes instantly into the normal light-gray form. An intermediate gold-like modification, D, has a bright-yellow instead of a deep-yellow color, is harder, and can be burnished; it gives no color reactions with potassium ferricyanide, ferric chloride, which only cause a slight deepening of the color. It is obtained by heating films of the gold-like modification, C, on glass or paper, at a temperature just below that at which the paper begins to carbonize. It seems probable that the gold-like, intermediate, and normal varieties represent respectively atomic, molecular, and polymerized forms of the metals. Since the silver haloids are affected by the same agents as allotropic silver, and always in the same direction, the author considers that silver probably exists in its haloid salts in one of its allotropic forms.—Jour. Chem. Soc., July, 1891, 803–805; from Am. J. Sci. 37, xli., 179, 259.

——— Carey Lea arrives at the following conclusions: The reduction of silver may be direct or indirect: direct when it passes from the condition of the normal salt or oxide to that of the metal; indirect when the change is first to a suboxide or to a corresponding subsalt. When the reduction is direct, the metal always separates in its ordinary form; but when the reduction is indirect, the silver presents itself in one of its allotropic modifications. The three principal modes of formation of allotropic silver are: (1) Reduction of silver citrate or tartrate by ferrous citrate or tar-

trate. (2) Action of dextrin and fixed alkaline hydroxide on silver nitrate or oxide. (3) Action of tannin and fixed alkaline carbonate on silver nitrate or carbonate. If the action of indirect reducing agents be interrupted before it is completed, by addition of an excess of dilute hydrochloric acid, a dark purple-brown mixture of silver subchloride and protochloride is precipitated, suggesting that silver exists in its subsalts in the allotropic form. M. C. Lea obtains the blue form as follows: 40 gm. of sodium hydroxide and 40 gm. of yellow or brown dextrin are dissolved in 2000 c.c. of water, and 28 gm. of silver nitrate is added in successive very small quantities, with frequent agitation. The solution is slightly turbid, and is deep-green by reflected light; red by transmitted light. The precipitate which forms spontaneously, or on addition of acetic acid, dilute nitric acid and many neutral substances, consists of blue silver, but if sulphuric acid is added, the precipitate when dried in films is blue, green, yellowish-green, or yellow, according to the proportion of acid used. —Pharm. Journ. Trans., Oct. 1891, 349, from Phil. Mag., 1891, 337.

——— R. Meldola takes exception to the term allotropic silver as applied to the gold-colored silver recently produced by Carey Lea, inasmuch as it has not been proven to contain fully 100 per cent. of silver.—Chem. News, 1891, lxiv., 283.

*Silver Residues—Recovery.*—R. Hussenot mixes the residues, when in solution, with ammonia in excess, and from this solution the silver is precipitated by copper. If the residues are insoluble in water and ammonia they are first boiled with sulphuric acid, when chlorine, bromine, etc., are expelled, and copper sulphate is formed, which is rendered alkaline, and the silver precipitated by copper. The silver may be used for the preparation of the nitrate; neither the ammonia nor the sulphuric acid need be pure.—Chem. News, 1892, lxv., 37; from Zeits. analyt. Chemie, 1891.

*Silver—Reduction by Hydroxylamine.*—A. Liner recommends the hydrochlorate of hydroxylamine (or the crude form of it, known as "reducing salt") for the purpose of separating silver and gold from their solutions, especially from photographers' waste.

The silver of the residues is first converted into chloride, then washed, and heated in a beaker with a piece of potassa and some crystals of hydroxylamine hydrochloride. The beaker must be rather capacious, and covered with a capsule or watch-glass, as there is much effervescence. After being heated to boiling, the reduction is complete. If cyanide of silver be present the reduction is more difficult. The first filtrate, which still contains silver in solution, should be evaporated to dryness in presence of a little more hydroxylamine. On now treating with water, all but the metallic silver will go into solution.—Am. Drug., 1892, 136.

*Silver—Electrolytical Separation.*—Edgar F. Smith and Frank Muhr have succeeded in separating silver nearly completely from platinum.—Chem. News, 1891, lxiv, 82, from Journ. Am. Chem. Soc., xiii.

*Silver—Reactions with Soap.*—H. Borntraeger calls attention to some interesting reactions he has noticed in combinations of silver and soap. On digesting freshly-precipitated oxide of silver with olive oil glycerin soap, a dark raspberry red solution is obtained, which fluoresces dark greenish brown. About 0.3 per cent. of the oxide of silver enters into solution. Treating cyanide of silver, freshly-precipitated, in the same manner, a dark green, non-fluorescent solution results, in which about 0.25 per cent. of the cyanide has dissolved. In both cases the colors are very intense and perceptible even in great dilution. The author remarks that by digesting soap with various metallic oxides we may obtain interesting and characteristic reactions. It is suggested that these reactions are due to the reduction of silver by the glycerin.—Drug. Circ., 1892, 122, from Pharm. Centralh.

*Organic Silver Salts—Dry Distillation.*—J. Kachler verified the statement made by Chenevix in 1809, that in the dry distillation of organic silver salts the organic acid distils over, leaving metallic silver and carbon. Acetic, isovalerianic, capronic, œnathylic, palmitic, lactic, oxyisobutyric, phenylacetic, and benzoic acids showed this behavior; for the four acids named first, he proved that the reaction was approximately according to the following: $4AgC_2A_3O_2 = 4Ag + 3C_2H_4O_2 + C + CO_2$.—Apoth. Zeitg. (Rep.), 1891, 121; from Monatsh. Chem., 1891, 338.

W. Kœnigs points out that the decomposition of organic silver salts when heated frequently takes a course quite different from that studied by Kachler. He quotes a number of well-known cases in which the silver salt is decomposed, with evolution of carbonic anhydride, yielding considerable quantities of a substance of which the acid in question is a carboxyl-derivative.—Jour. Chem. Soc., 1892, lxi., Abstr., 293; from Ber., 1891, xxiv., 3589.

*Silver Ware—Blackening Prevented.*—To prevent silver from getting black from the absorption of sulphuretted hydrogen, one of the most efficient methods is to wrap the objects in paper containing or coated with white of lead. The latter may either be applied to the surface of the wrapping paper by means of starch paste, or the paper may be impregnated with a solution of acetate of lead, dried, then impregnated with a solution of sodium carbonate, and again dried. The paper will now contain acetate of sodium and carbonate of lead.

Only such objects can be fully protected by this paper as can be completely wrapped therein, so that the air may be entirely deprived of hydrogen sulphide.—Am. Drug., Aug. 1891, 240.

*Silver—Blackening.*—The matted or frosted silver is first dipped or brushed with nitrate of mercury solution diluted with water, and afterwards exposed to sulphur vapor. Absolute "crow"-black is produced by coating with thin asphaltum varnish, and then baking it in a japanning oven.—Chem. Drug., Sept. 1891, 478.

*Chloride of Silver—Decomposition by Light.*—The difference of opinions as to the nature of the decomposition product of chloride of silver by light, some maintaining that the darkened product was a subchloride, while others considered it an oxychloride, induced A. Richardson to reexamine the subject. He found as the result of his experiments that a subchloride is formed, no oxygen being present in the product, which was finally conclusively shown by exposing silver chloride, previously dried with extreme care, placed in a tube containing pure dry carbon tetrachloride, from which all air was expelled by boiling; the chloride rapidly darkened, although it was certain that no oxygen was present.—Journ. Chem. Soc., July 1891, 536–544.

——— R. Hitchcock finds that on exposing thin layers of silver chloride to the action of sunlight the silver salt gradually lost its chlorine, and, if the experiments had been conducted farther, probably all the chlorine would have been eliminated. As it was, he observed that warm diluted nitric acid dissolved from the exposed silver chloride an amount of silver corresponding exactly to the chlorine lost.—Zeits. Analyt. Chem., 1892, 190, from Am. Chem. Journ., xi., 474; xiii., 273.

——— H. Brereton Baker has endeavored to find out whether oxygen is absorbed at the same time that chlorine is evolved. The results arrived at point to the fact that oxygen is present in the darkened substance in a combined state, and that really an oxychloride is formed. If the darkened substance be really an oxychloride, it should not be produced in the absence of oxygen. This was found to be the case, no darkening being observed in a vacuum or in carbon dioxide. Likewise, no darkening was produced when silver chloride was exposed under pure dry carbon tetrachloride. It is to be noted, however, that carbon tetrachloride, unless carefully purified, contains substances, such as alcohol, carbon bisulphide, etc., which cause the reduction of silver chloride and the deposition of black silver or silver sulphide.—Chem. News, 1892, lxv., 307.

*Silver Chloride—Action of Light.*—It is well known that on exposing silver chloride to light in a thin layer upon a glass plate, it is at first colored only very slightly, but if it is then placed in a solution of iron oxalate, the silver chloride is reduced, with a formation of metallic silver. Guntz has succeeded in producing a modification of silver chloride, which in the absence of light is directly reduced by the oxalate solution. It is merely necessary to boil silver chloride for some hours in the dark. A layer of silver chloride after exposure to light consists of three superimposed layers, metallic silver, silver subchloride and unaltered silver chloride.—Chem. News, July 31, 1891, 60, from Comptes rendus, cxiii., 1891, No. 2.

*Silver Nitrate in Sticks.*—That lunar caustic quite rapidly gets corroded when kept—as is frequently the case—in flaxseed, etc., has long been noticed. A. Barille thinks that volatile and fatty oils are the cause of it,

and recommends, therefore, to keep the sticks in powdered pumice stone instead.—Am. Journ. Pharm., 1891, 596, from Rep. Pharm., 1891, 403.

*Silver Nitrate—Detection of Lead.*—Precipitate a solution of the argentic nitrate with hydrochloric acid, transfer to a filter, and wash the precipitate with boiling water. A few drops of potassium bichromate will produce a yellow precipitate.—Apoth.-Zeitg., 1892, 131.

*Silver—Preparation of Nitrate from Residues.*—R. Dietel proceeds as follows: The residues, as fast as they accumulate, are thrown into dilute hydrochloric acid, and, when a sufficient quantity has collected, the silver chloride is well washed, and reduced by metallic iron in dilute hydrochloric acid. After washing the silver (which always retains some of the iron) until every trace of chlorine has disappeared, it is dissolved in pure nitric acid. A small portion of this solution is precipitated boiling hot with soda solution, and the mixture of argentic and ferric oxide is well washed, and kept for use as hereinafter noted.

The remaining part is evaporated to dryness, and fused until the ferric nitrate is decomposed, when the mass is dissolved in water, and filtered to free it from the ferric oxide. If the solution should be of a more or less distinct yellowish color, which is due to a little undecomposed ferric nitrate, it must be boiled with the ferruginous argentic oxide, mentioned above, until all the iron has been converted into oxide, when a filtered and diluted sample gives a purely white precipitate with potassium ferrocyanide.—Pharm. Zeitg., 1892, 16.

*Silver Nitro-silicate.*—G. Rousseau and G. Tite succeeded in preparing this salt by mixing silica, dried at 100° C. with dry silver nitrate, and kept for some hours in fusion in a silver crucible at temperatures of from 350 to 440° C. Silver nitro-silicate appears in the form of short prisms of a ruby red color when seen by transmitted light; when thicker they become opaque, and appear bluish-black by reflected light.—Chem. News, 1892, lxv., 109; from Comptes rendus, 1892, cxiv., 291.

## AURUM.

*Gold—Recovery from Waste by Hydroxylamine.*—A. Liner proceeds as follows: The gold is first converted into the chloride, and heated in a porcelain capsule with a little water and a crystal of hydroxylamine hydrochloride, when the solution soon becomes colorless. The separated gold is washed with boiling water, and, after drying, weighed. 0.4012 gm. of crystallized chloride of gold and sodium yielded 0.2086 gm. of gold, or 51.99 per cent.; theory requires 52.05 per cent., the method, therefore, is quite accurate.—Am. Drug., 1892, 136.

*Gold—Electrolytical Separation.*—Edgar F. Smith and Frank Muhr have succeeded in the nearly complete separation of gold from palladium, platinum, copper, cobalt, nickel and zinc by electrolysis.—Chem. News, 1891, lxiv., 81, from Am. Chem. Jour., xiii.

*Chloride of Gold and Potassium—For Photographer's Use.*—A. Lainer dissolves 100 gm. of pure gold in nitrohydrochloric acid, and adds 38 gm. of chloride of potassium, dissolved in as little water as possible; set the flask aside to allow the crystals to form, pour off the mother-liquor, and heat the crystals to 100° C. to drive off the acid. The resultant salt has the formula $AuCl_3KCl$, and contains 51.99 per cent. of gold and 19.96 per cent. of chloride of potassium.—Chem. and Drug., July 18, 1891, 77.

### PLATINUM.

*Platinum Group—Atomic Weights.*—The latest determinations of the atomic weights of gold and of the metals of the platinum group account for the anomalies previously observed in the classification of these metals, according to the natural system. K. Seubert places them now in the following order:

| | | | |
|---|---|---|---|
| Ruthenium | 101.4 | Rhodium | 102.7 |
| Osmium | 190.3 | Iridium | 192.5 |
| Palladium | 106.35 | Silver | 107.66 |
| Platinum | 194.3 | Gold | 196.7 |

—Jour. Chem. Soc., Aug. 1891, 885; from Annalen, cclxi., 272–279.

*Platinum—Gaseous State below its Melting Point.*—W. Spring noticed that when leaflets (foil) of platinum were heated to 150° C. with concentrated hydrochloric acid in sealed tubes, the metal was dissolved, and the chloride formed reduced by the hydrogen evolved from the metal and the acid. It was deposited on the sides of the tubes in microscopic crystals. The author assumes that the platinum existed for some time in the liquid state before taking a crystalline form.—Chem. News, 1892, lxv., 276, from Zeits. anorganische Chemie.

*Platinum—Volatile Compounds.*—W. Pullinger.—Jour. Chem. Soc., July 1891, 598–604.

*Platinum—Action.*—Ilosva has observed that platinum at high temperature causes the combination of oxygen and nitrogen. This action commences at 180° C. with platinum black; at 250° C. with platinum sponge; and at 280° C. with platinum foil. After prolonged heating at 300° C. the metal loses its activity.—Yearbook, 1891, 23, from Ber., xxiii., 1447.

*Platinum.*—On the electrolytical separation of gold, silver and mercury from platinum see Edgar F. Smith and Frank Muhr in Chem. News, 1891, lxiv., 82; from Jour. Am. Chem. Soc., xiii.

*Platinum.*—Gawalowski states that fine platinum, which when bent is difficult to straighten, can easily be rendered straight by stretching it horizontally whilst being passed through the flame of an ordinary spirit lamp. —Chem. News, 1891, lxiv., 177.

*Platinum—Purification.*—The purest platinum made at present, that

from Johnson, Matthey & Co. (London), contains still about 0.02 per cent. impurities, consisting chiefly of silver and rhodium; the German-made is still more impure. W. C. Heraeus has succeeded in obtaining platinum with only 0.01 per cent. of impurities, chiefly iridium, by heating it in a current of chlorine and carbon monoxide, when the platinum becomes volatilized, combining with the gases. Incidentally it was found possible to bring the gaseous compounds into aqueous solution, and to prepare from this by double decomposition a series of crystalline derivatives. The above-described method is at present not available for working on the large scale.—Am. Drug., 1891, 221; from Zeits. f. Instrum.-Kunde, 1891, 167.

*Platinum Chloride—Purity.*—According to C. Krauch, platinic chloride is sufficiently pure when it dissolves clear in absolute alcohol, and after ignition contains nothing soluble in diluted nitric acid. A. F. Holleman, however, states that these requirements do not suffice; it will be necessary, in addition, to require complete absence of sulphuric acid, which contamination is often present.—Chem. Zeitg., 1892, 35.

*Platinum—Bromonitro Compounds.*—M. Vèzes describes a series of bromonitro compounds, starting from *potassium platonitrate*, $K_2Pt,4NO_2$, forming the *platibromonitrite*, $K_2Pt,4NO_2,Br_2$, and the *platibromonitrosonitrite*, $K_2Pt,NO,2NO_2,Br_3$; which latter by prolonged heating with water is decomposed, forming *potassium platinobromide*, $K_2PtBr_6$.—Jour. Chem. Soc., July 1891, 807; from Compt. rend., cxii., 616.

*Platinum—Russian Mines.*—An interesting account of the occurrence of platinum in Russia is found in Am. Drug., Aug. 1891, 252, from which we learn that the output in 1886 amounted to 184,336 ounces; that it has hitherto only been found in alluvial deposits and always associated with gold. The peridotite rock is probably the true mother rock of platinum. The richest deposit of the Nijni-Taguil district is that of Avarinski, extending for a length of 2 km., 20 to 60 meters wide, and 4 to 5 meters thick. The platinum is found there to the amount of from 4 to at times 9 ounces per ton; the gravel can be worked profitably with as little as $\frac{1}{10}$ ounce per ton.—Am. Drug., Aug. 1891, 252.

## PALLADIUM.

*Palladium—Properties.*—V. B. Lewes points out that the property of finely-divided palladium of causing the oxidation of hydrogen, but not of methane, when a mixture of these gases with air is passed over it, and in this way make a separation of gases possible, owing to the fact that the carbonic oxide is also oxidized to carbonic anhydride, may be made use of for the analysis of the products of incomplete combustion.—Jour. Chem. Soc., 1892, lxii., Abstract, 407; from Jour. Soc. Chem. Ind., 1892, 413–417.

*Palladium—Plating.*—Pilet uses the following bath: Water, 2 litres; palladium chloride, 10 gm.; ammonium phosphate, 100 gm.; sodium phosphate, 500 gm.; benzoic acid, 5 gm. It is stated to be applicable to all metals excepting zinc.—Apoth.-Zeitg., 1891, 461.

### RHODIUM.

*Rhodium—Double Nitrites.*—E. Leidie describes the double nitrites of rhodium with potassium, sodium, ammonium, and barium. He thinks that the properties of these double nitrites may be utilized for the extraction of rhodium, for its separation from other metals of the platinum group, and for its quantitative estimation.—Jour. Chem. Soc., July 1891, 808; from Bull. Soc. Chim., (3,) iv., 809.

### OSMIUM.

*Osmium—Atomic Weight.*—Some time ago K. Seubert found the atomic weight of osmium to be 191 as the average of several not very closely-agreeing determinations; the author has therefore undertaken a fresh investigation with a different sample of the metal, and with improved apparatus, but employing the former method namely, the analysis of potassium osmiochloride, $K_2OsCL_6$; ammonium osmiochloride, $(NH_4)_2$-$Os_2Cl_6$ was also analyzed. The average of 16 analyses of the potassium salt gives Os=190.3(O=15.96). Two determinations of the percentage of metal in the ammonium salt gave Os=190.76; as this result is probably too high, owing to the presence of oxychloride in the salt employed, it may be neglected. The atomic weight may therefore be taken as 190.3; its true value is not known within about 0.2 per cent., but it is certainly less than that of iridium.—Journ. Chem. Soc., Aug. 1891, 884, from Annalen, cclxi., 257–272.

*Osmiamic Acid and the Osmiamates.*—A. Joly prepares the potassium salt of osmiamic acid (discovered by Fritzsche and Struve in 1847) by dissolving crystalline osmium tetroxide in potassa ($OsO^4$ 100, KOH 100, water 50). To the liquid, which is kept at 40° C., he adds 40 of caustic ammonia, when in a few minutes the liquid is decomposed, and a yellow crystalline precipitate of potassium osmiamate is deposited. The liquid portion is decanted after cooling, the salt washed with iced water, and dissolved in boiling water. In crystallizes on cooling in fine quadric octahedra. An excess of ammonia must be avoided, because it would leave the potassium osmiamate mixed with a very unstable ammoniacal salt. The formula is $OsO_3NK + 2H_2O$. Osmiamic acid may be approximated to the nitroso-compounds of ruthenium, $RuNOCl_3$, $RuNO(OH)_3$. If we admit the existence of a compound $OsNO(OH)_3$, the acid will be its first anhydride.—Comptes rendus, cxii., No. 25, through Chem. News, July 10, 1891, 26.

MASRIUM.

*Masrium.*—Richmond and Off announce the discovery of what they believe to be a new element. In the examination of a hitherto unknown mineral found in Egypt, they have detected traces of a substance indicating the presence of an unknown metal, which they provisionally have named "Masrium" from the ancient name of Egypt.

The mineral proved to be a compound of aluminium, manganese, iron and cobalt in the form of sulphates, containing 0.2 per cent. of the unknown substance set down as an oxide, the base of which is assumed to be a metal which has been named masrium, and given the symbol Ms. The supposed metal is soluble in hydrochloric acid, from which hydrogen sulphide does not precipitate it; but the addition of acetic acid to the reagent produces a white precipitate. It gives a white gelatinous precipitate with ammonia, insoluble in excess, and similar precipitates with ammonium sulphide and carbonate. With potassium ferrocyanide it gives a white precipitate insoluble in excess of the precipitant, but soluble in excess of masrium chloride. Potassium ferricyanide yields no precipitate. Oxalic acid gives a white precipitate soluble in acetic acid and in excess of the chloride of the metal. A basic salt is precipitated on boiling a neutral solution of the acetate, but redissolves on cooling. Neutral potassium tartrate gives a precipitate soluble in excess of the precipitant, and from this solution ammonia does not precipitate masrium hydrate. The caustic alkalies give white precipitates soluble in excess. The soluble salts are also white, and of those that have been examined the sulphate $MsS_4$-$8H_2O$, crystallizes best, either from its aqueous solution or, preferably, from 50 per cent. alcohol. Experiments to separate the metal have been unsuccessful, and the examination has been limited by the smallness of the amount of mineral at hand. No mention is made of a spectroscopic test, although it would seem that this would have been easy and perhaps decisive.

The investigators put the atomic weight of masrium at about 228, and point out that according to this it would fall in the second series and twelfth group of the periodic system.—Druggists' Circular, 1892, 121, from Chem. Zeitg., 1892, 567, 648.

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# ORGANIC CHEMISTRY.

GENERAL.

*Acetone—Fractionation of the Crude Oil Boiling between 75° and 135° C.*—By L. Wolfes.—Journ. Chem. Soc., 1891, 819, from Chem. Zeitg., xiv., 1141.

*Acetone—Test of Identity.*—This test depends upon the formation of

iodoform from acetone and iodine in the presence of ammonia; it is of special value, since alcohol does not form iodoform in the presence of ammonia. A. Schwicker adds to a little of the solution to be tested a few drops of strong ammonia water, and then 1 to 2 drops of decinormal iodine solution; a dark turbidity will be due to nitrogen iodide, which disappears on warming (if not too little acetone is present), and shows the yellowish turbidity due to iodoform; more iodine solution can then be added until the nitrogen iodide ceases to disappear (which then can be accomplished by the cautious addition of a dilute solution of sodium thiosulphate). The odor of the iodoform is not affected by the presence of ammonia. The reaction is quite delicate, 1 part of acetone in 5,000 parts of water giving the precipitate in a few minutes; the test is considered a good one for the detection in urine. It is thought that all bodies containing the group $CH_3.CO$ will give the reaction.—Am. Journ. Pharm., Aug. 1891, 407, from Chem. Ztg., 1891, 914.

This reaction was first mentioned by Gunning in 1884, and has been applied by several chemists.

*Denaturated Alcohol—Determination of Acetone.*—Leo Vignon utilizes Licten's iodoform reaction. After having eliminated aldehyd, if necessary, 5 c.c. are diluted to 250 c.c. with distilled water (A). In a test glass with foot, graduated to 100 c.c. and fitted with a ground stopper, he introduces 10 c.c. of binormal soda (2NaOH, in gms.=1 litre) and 5 c.c. of A. After shaking up, pour into the glass 5 c.c. of binormal iodine (2I+2KI, in gms.=1 litre), and shake up again; the iodine liberated is dissolved by the addition of 5 c.c. of ether. On weighing the residue from the evaporation of the ether, under known conditions, the quantity of acetone is known.—Chem. News, July 31, 1891, 61, from Bull. Soc. Chimique, v., No. 10.

*Acetone—Solubility of Inorganic Salts.*—W. H. Krug and K. P. McElroy have investigated the solubilities of various inorganic salts in acetone:

CHLORIDES.

*Insoluble*—Sodium, potassium, ammonium, anhydrous nickelous, and mercurous. *Very sparingly soluble*—Calcium, barium, anhydrous strontium. *Somewhat soluble*—Anhydrous cadmium. *Freely soluble*—Ferric, zinc, anhydrous cobaltous, crystalline cupric. *Very freely soluble*—Mercuric.

BROMIDES.

*Slightly soluble*—Potassium, sodium. *Freely soluble*—Anhydrous cadmium.

IODIDES.

*Soluble*—Potassium, mercuric.

CYANIDES.

*Freely soluble*—Mercuric.

SULPHOCYANIDES.

*Freely soluble*—Potassium, ammonium. *Soluble*—Ferric, cobaltous. *Insoluble*—Nickelous.

NITRATES.

*Insoluble*—Barium, bismuth. *Very slightly soluble*—Sodium, potassium, lead. *Slightly soluble*—Ammonium, crystalline nickelous. *Soluble*—Silver.

CARBONATES.

*Insoluble*—Potassium, anhydrous sodium.

SULPHATES.

*Insoluble*—Anhydrous copper, potassium, anhydrous ferric, crystalline ferrous ammonium, anhydrous ferrous.

ACETATES.

*Insoluble*—Magnesium, sodium, calcium. *Slightly soluble*—Crystalline copper, crystalline lead. *Soluble*—Crystalline zinc.

MISCELLANEOUS.

*Insoluble*—Potassium ferrocyanide, mercuric sulphide, ferric pyrophosphate, ammonium molybdate, ammonium oxalate, ammonium tartrate. *Very slightly soluble*—Potassium chlorate. *Freely soluble*—Boric acid, malic acid, tartaric acid, oxalic acid.

The solubility has been determined for the following at 25° C.: One hundred parts of acetone by weight dissolve: Potassium iodide 2.930; potassium bromide 0.023; mercuric chloride 50.990; mercuric iodide 2.090; anhydrous cobaltic chloride 8.620.

*Acetone—Solubility in Dextrose Solutions* (*Glucose*).—The same authors determined the solubility of acetone in glucose of different strength at 25° C. One hundred gm. of glucose solutions dissolve:

| Per cent. of glucose. | Grammes of acetone. |
|---|---|
| 10 | 747.86 |
| 20 | 237.71 |
| 30 | 146.30 |
| 40 | 72.72 |
| 50 | 32.70 |

—Chem. News, 1892, lxv., 255, from Jour. analyt. appl. Chem.

*Nitrogenous Organic Bases—Formation by the Decomposition of Proteids in the Vegetable Organism.*—When the seeds of *Lupinus luteus*, *Soja hispida*, and *Cucurbita Pepo* are allowed to vegetate in the dark for 12–14 days and the shoots extracted with water, a solution is obtained which, after removing the proteids as completely as possible, yields a precipitate with phosphotungstic acid. This contains considerable quantities of nitrogen, and on treatment with milk of lime, yields nitrogenous organic bases. From *Lupinus luteus* and *Cucurbita Pepo* the author has been able to isolate the arginine described by Schultz and Steiger (see Proceedings xxxvi., 396, 568), whilst *Soja hispida* yields a base which is either identical with or closely allied to arginine.—E. Schulze.—Jour. Chem. Soc., July 1891, 856; from Ber., xxiv., 1098.

*Organic Bases—A New Class.*—C. Stoehr has obtained by the action of ammonium salts on glycerin a new series of bases of the general formula

$C_nH_{2n-4}N_2$, which may be regarded as homologues of the diamine $C_4H_4N_2$. One of these bases is a colorless, strongly refractive liquid of the composition $C_6H_8N_2$, boiling at 154° C., and having an odor resembling that of nicotine. A second base was also isolated, $C_8H_1\ N_2$.—Year-book, 1891, 63; from Journ. prakt. Chem., xliii., 156–160.

*Organic Compounds—Action of Sunlight.*—By H. Klinger and O. Standke.—Jour. Chem. Soc., Aug. 1891, 900: from Ber., xxiv., 1340–1346.

*Saccharin—Solubility.*—The solubilities hitherto given are more or less inaccurate, due to the experiments having been made with impure saccharin. The following table is correct.

| | | |
|---|---|---|
| 1 litre of water dissolves | 2.5 to 3 | gm. of pure saccharin. |
| " 10 per cent. alcohol dissolves | 2 | " " |
| " 20 " " " | 2 | " " |
| " 30 " " " | 3 | " " |
| " 40 " " " | 6 | " " |
| " 50 " " " | 11 | " " |
| " 60 " " " | 20 | " " |
| " 70 " " " | 19 | " " |
| " 80 " " " | 16 | " " |
| " 90 " " " | 17 | " " |
| " 100 " " " | 17 | " " |

Besides the pure article, a saccharin containing 10 per cent. of sodium bicarbonate, suitable for the household (because more soluble) is sent out by Fahlberg, List and Co.—Pharm. Post, 1892, 83.

*Saccharin—Derivatives—Relation between Constitution and Taste.*—The most characteristic property of parabromo-sulphinide is that it possesses two distinct tastes, a bitter and a sweet, and the corresponding chlorine compound has the same peculiarity in even a more marked degree. R. de Roode has therefore investigated other para-halogen-sulphinides and the substances from which they are made, and observed their effect upon the nerves of taste.

*Parafluorosulphinide* has a purely sweet and a slight bitter after-taste. *Parachlorosulphinide* has both a sweet and a bitter taste, the latter the more intense. *Parabromosulphinide* has both tastes in a less marked degree. *Paraiodosulphinide* is only slightly bitter.—Am. Jour. Pharm., 1891, 552, from Am. Chem. Jour., 1891, xiii., 217–232.

*Gluside,* the name given to *saccharin* in the Brit. Ph.,—*uses.* See under *Syrupus* in "Pharmacy."

*Saccharin,* effect *on the digestion of albuminoids.* See under *Albuminoids.*

## GLUCOSIDES.

*Saponin.*—R. Kobert suggests, in view of the varying physiological action of the different saponins, that the name of each saponin should in-

dicate the source.—Jour. Chem. Soc., 1892, lxi., Abstr., 350, from Chem. Centralbl., 1891, ii., 545.

*Sapotin.*—This is a new glucoside obtained by G. Michaud from the seeds of Achras Sapota, L., a large tree of the West Indies and Central America. The seeds are freed from fatty matter by benzol, and exhausted with boiling alcohol. The filtrate will, on cooling, deposit the glucoside in microscopic crystals. It is very soluble in water and in boiling alcohol, less so in cold alcohol, insoluble in chloroform, ether and benzin. It melts at 240° C., and its formula is $C_{29}H_{52}O_{20}$. It does not reduce Fehling's solution. When heated with water and a little sulphuric acid it is changed into glucose and sapotiretin, $C_{17}H_{32}O_{10}$.—Pharm. Record, 1892, xiii., 112, from Am. Chem. Jour., 1891, 572.

## HYDROCARBONS AND VOLATILE OILS.

*Aromatic Amines—Color Reactions.*—Ch. Lauth gives a list of color reactions of (29) aromatic amines with lead peroxide. To one drop (or fragment of a crystal, as the case may be), add ten drops of dilute acetic acid (3 vol. acetic acid and 7 to 8 vols. water or alcohol); a few granules of lead peroxide are placed so that they barely touch the liquid when the color reactions commence to appear. It is advisable to use both an aqueous and an alcoholic dilution of acetic acid, because the play of color is more or less different. For particulars see Zeitschr. analyt. Chemie, 1891, xxx., 489.

*Aromatic Compounds—Action of Halogens in presence of Light.*—By J. Schramm, Journ. Chem. Soc., Aug. 1891, 898, from Ber., xxiv., 1332–1337.

*Benzol, Benzin, etc.*—Since the English and American terms apply to different substances, the following explanation from Chemist and Druggist will be useful: English "benzine" is pure benzol sp. gr. about 0.800. English "benzoline" is called benzin in the United States, but "petroleum ether" in England.—Chem. Drug., Sept. 1891, 421.

*Benzol—Test of purity.*—The occurrrence of carbon bisulphide in crude benzene is well known. Messrs. C. Liebermann and A. Seyewitz point out that most of the commercial pure benzol boiling at 80° to 82° contains this substance, the presence of which can be readily detected by means of phenylhydrazin. On the addition of this reagent to a small quantity of the benzol, phenylhydrazin phenylsulphocarbazide,

$$CS\begin{matrix}\diagup S.N_2H_2C_6H_5 \\ \diagdown N_2H_4C_6H_5\end{matrix}$$

which melts at 97°, separates out after a short time.

The presence of carbon bisulphide in so-called pure benzol may sometimes lead, in working with certain substances, to very annoying secondary reactions. The average percentage of $CS_2$ in such benzol was calculated by the authors, from the weight of sulphocarbazide formed, to be 0.2 to 0.3.

The testing of benzol can easily be carried out and quantitative results obtained by treating 10 c.c. of benzol with 4 to 5 drops of phenylhydrazine, and shaking vigorously at intervals during an hour or an hour and a half. When 0.2 per cent. of $CS_2$ is present, the precipitate appears quite voluminous, and with 0.03 per cent. it is still quite easily preceptible; but the limit of the reaction appears to be reached at 0.02 per cent. (0.17 gm. in a litre), and it is necessary to start the crystallization by adding a crystal of the sulphocarbazide. By submitting the benzol to a distillation and testing the first portion of the distillate, the examination can be pushed still further.—Am. Drug., July 1891, 224; Ber., 1891, xxiv., 788.

*Benzol—Clarification.*—Benzol being very sensitive to the presence of the least amount of moisture, turning milky, may easily be clarified by inserting a wad of absorbent cotton into the bottle.—Western Druggist, 1892, 14: from Microscope.

*Benzol—Use.*—Dr. W. Robertson highly extols the usefulness of benzol in whooping-cough; two minims in mucilage are sufficient for a child six months old, and five minims for adults.—Am. Jour. Med. Sci., 1891, cii., 403; from Lancet.

*Nitrobenzol—Preparation.*—A. Angeli prepares it by mixing a solution of diazobenzene nitrate, acidified with nitric acid, with solutions of copper sulphate and sodium hypophosphite, and gently warming.—Jour. Chem. Soc., 1892, lxi., Abstr., 305; from Gazzetta, xxi., 258.

*Nitrobenzol—Detection in Oil of Bitter Almonds.*—See under *Oil of Bitter Almonds.*

*Benzin.*—According to A. Veith, the boiling points of the different fractions of crude benzin are:

| | |
|---|---|
| Petroleum benzin at from | 30° to 50° and 60° C. |
| Light benzin | 60° to 80° C. |
| Medium benzin | 80° to 100° and 110° C. |
| Heavy benzin | 110° to 140° C. |

The fractions distilling between 80° and 120° C. are the best for the extraction of fat and oil.—Pharm. Post, 1892, 94, from Ap. Ztg.

*Isobenzile—Preparation.*—By H. Klinger and O. Standke.—Jour. Chem. Soc., Aug. 1891, 931, 932, from Ber., xxiv., 1264–1277.

*Chlorobenzene (-benzol)—Preparation.*—A solution of aniline (9.3 gm.) in hydrochloric acid (40 gm.) and water (60 gm.) is slowly mixed with a solution of sodium nitrite (7 gm.), and then with a solution of copper sulphate (12.5 gm.) and sodium hypophosphite (7 gm.), when a brisk effervescence ensues, owing to an evolution of nitrogen; as soon as this is over, the product is steam-distilled, and the chlorobenzol separated and rectified. It passes over almost entirely at 132° C.

*Bromobenzol* and *Iodobenzol* are prepared in a similar manner. The

yields are very good, and the operations are speedily performed.—A. Angeli.—Jour. Chem. Soc., 1892, lxi., Abstr., 305, from Gazzetta, xxi., 258.

*Benzidine-disulphonic Acid—Derivatives.*—By H. Limpricht.—Jour. Chem. Soc., Aug. 1891, 929; from Annalen, cclxi., 310-338.

*Nitro-phenyl-azimido-benzol—Fluorescent Property.*—Some time ago Willgerodt obtained a derivative of benzol which he regarded as dinitroso-azobenzol. Recently F. Kehrmann and J. Messinger have studied the same body, and have found that it is, in reality, a nitro and not a nitroso-compound, its proper name, according to the present rules of nomenclature, being nitro-phenyl-azimido-benzol. The body is prepared in the following manner:

Twenty gm. of dinitrobrombenzol, mixed with 2 molecules of phenylhydrazine and 1 molecule of sodium acetate, and contained in a flask holding about ½ L., are heated with 200 c.c. of alcohol, under an upright condenser, at a boiling temperature, until the mass becomes viscid from the formation of crystals. After cooling, the latter are separated from the liquid by means of a filter pump, then boiled with small quantities of alcohol to remove adhering impurities, and finally recrystallized from boiling benzol.

The product appears in almost colorless needles, showing a brownish fluorescence.

This substance is remarkable through its property of exhibiting a different fluorescence in its different solvents:

*Water.* In this liquid the substance is almost insoluble. Yet the very weak watery solution has a *pure-green* fluorescence.

*Alcohol*—Bluish-green fluorescence.

*Ether*—Ultramarine-blue fluorescence.

*Benzol*—Violet fluorescence.

*Chloroform*—Like benzol.

*Carbon Disulphide*—No fluorescence visible to the eye.—Am. Drug., 1892, 140; from Ber. xxv., 898.

### "MISCELLANEOUS."

*Isoprene—Spontaneous Conversion into Caoutchouc.*—Isoprene is a hydrocarbon, which was discovered by Greville Williams many years ago among the products of the destructive distillation of india-rubber. W. A. Tilden observed it among the more volatile compounds obtained by the action of a moderate heat upon oil of turpentine and other terpenes. It boils at about 36° C. Its molecular formula is $C_5H_8$, and it forms a tetrabromide, $C_5H_8Br_4$, but no metallic derivatives, like the true homologues of acetylene.

Bouchardat observed that when isoprene is heated to a temperature near 300° C., it gradually polymerizes into a terpene, which he called di-

isoprene, but which is now usually called dipentene. This compound boils at 176° C. A quantity of colophene similar to that which is produced by the action of heat upon turpentine is formed at the same time.

When isoprene is brought in contact with strong acids, aqueous hydrochloric acid for example, it is converted into a tough, elastic solid, which appears to be true india-rubber. Tilden found, on examining the contents of bottles containing isoprene from oil of turpentine, that the previously limpid, colorless liquid had been transformed into a dense syrup, in which were floating several large masses of solid of a yellowish color, which turned out to be india-rubber. Tilden can only account for this spontaneous polymerization by assuming that a small quantity of acetic or formic acid had been produced by the oxidizing action of the air, and the presence of this compound had been the means of transforming the remainder. The liquid was acid to test-paper. The artificial india-rubber, like the natural rubber, appears to consist of two substances, one of which is more soluble in benzol or in carbon bisulphide than the other. It unites with sulphur in the same way as ordinary rubber.—Chem. News, 1892, lxv., 265.

*Anthracene—Action of Nitric Acid.*—A. G. Perkins points out that anthracene is more readily oxidized than nitrated, and, therefore, when treated with nitric acid, the hydrocarbon is at once converted into anthraquinone, and this, by the further action of the acid, then yields the well-known nitro-anthraquinones. The author has investigated the action further, and obtained several very interesting substances, *anthracene ethyl nitrate*, *pseudonitrosoanthrone* and *anthracene methyl nitrate*.—Journ. Chem. Soc., Aug. 1891, 634–648.

*Coalic Acid.*—This name has been given provisionally by Friswell to an acid obtained from coal by treating it with 34 per cent. nitric acid. Nitrous fumes are given off, and the acid dissolves the earthy part. When the black residue is washed, and treated with sodium carbonate, it dissolves, and from the solution a sodium salt can be obtained in small black crystals. The dried acid has a similar appearance; it is of an explosive nature, and when heated gives off copious volumes of hydrocyanic acid.—Chem. Drug., Jan. 1892, 135.

*Coal-tar—Indene and Cinnamene.*—G. Kraemer and A. Spilker have isolated from the higher fractions of the light oils a colorless hydrocarbon of the composition $C_9H_8$, which they propose to name "indene." Its constitution is represented by the formula $C_6H_4{<}{CH \atop CH_2}{>}CH$. The red coloration, which is produced on dissolving impure naphthalin in sulphuric acid is due to the presence of indene.

*Cinnamene* can be isolated from coal-tar in the form of the crystalline di-bromide, $C_8H_8Br_2$, by treating well-cooled, crude xylene with bromide

and evaporating the solution.—Yearbook Pharm., 1891, 83, from Ber., xxiii., 3276–3283.

*Artificial Asphaltum.*—E. Valenta prepares it by dissolving sulphur in molten rosin, and heating to 250° C., when the evolution of gases ceases, and the mass turns brownish-black. It resembles in its properties the Syrian asphaltum, and is easily soluble in chloroform and benzol, but not in alcohol. Thin layers of the benzolic solution are remarkably sensitive to light.—Chem. Zeitg. (Rep.), 1891, 211.

*Coke—Increasing the Decolorizing Power.*—Koch (Germany) has patented the following: 3 parts of easily fusible caustic, or carbonated alkalies are fused, about 2 parts of finely ground cokes added, and the mass kept at a red heat for about 20 minutes, under continuous stirring. The cooled mass is powdered, the alkali washed out with hot water, the mass faintly acidulated with hydrochloric acid, and again washed out.—D.-A. Apoth. Zeitg., July 1891, 61.

*Ichthyol.*—Ichthyol stains can be removed by soap or soap liniment.—Pharm. Centralh., 1892, 252.

*Magnesium Ichthyolate—Preparation.*—Mix 7.75 gm. of ammonium ichthyolate with 1 gm. of freshly calcined magnesia and sufficient water to make an emulsion. Evaporate with continuous stirring on a water-bath to dryness. A chocolate-brown mass is obtained which will weigh about 5.4 gm. Magnesium ichthyolate makes very good pills, and can be applied as dusting powder, mixed with talcum.—Apoth. Zeitg., 1891, 437.

*Mineral Oils—Saponification.*—G. Kreutsch and Wald have patented the following process: 120 parts of mineral oil (not too impure) are mixed with 50 parts of olein, and heated. As soon as the mass commences to boil, a solution of 15 parts of soda in 30 parts of water is added, and the boiling continued until the mass begins to thicken. After cooling, the soap should dissolve entirely in water.—Chem. Zeitg., 1891, 1774.

*Paraffin in Diphtheria.*—A. M. Sidney-Turner has treated diphtheria successfully with paraffin (oil?). After scraping off the diphtheritic patch, the paraffin is applied every hour to the thoat with a camel's hair brush.—Chem. Drug., Sept. 1891, 483.

*Petroleum—Origin.*—During the year several new theories have been offered, none of which appears to be entirely satisfactory. They will be found: C. Ochsenius, Chem. Zeitg., 1891, 935–940, 1735; R. Zaloziecki, Chem. Zeitg., 1891, 1203–1205; O. C. D. Ross, Chem. News, 1891, lxiv., 191; B. Redwood, Chem. News, 1891, lxiv, 215; O. Sickenberger, Chem. Zeitg., 1891, 1582.

*Petroleum—Constitution of Oxygen Compounds.*—R. Zaloziecki.—Jour. Chem. Soc., Sept. 1891, 999, from Ber., xxiv., 1808–1815.

*Petroleum.*—An interesting account of the transatlantic transportation of

petroleum will be found in Pharm. Jour. Trans., Feb. 1892, 654, from Oil, Paint and Drug Reporter.

*Petroleum, Refraction Index.* See table under *Fixed Oils.*

*Petroleum and Lubricating Oils—Refining.*—A somewhat detailed account of the refining process will be found in Am. Drug., 1892, 59.

*Petroleum—Solidification.*—S. Rideal has critically examined the patent literature on this subject, and divides the methods into three classes:

(1) *With Soap.* Rideal found that a better product is obtained by forming the soap in contact with the petroleum, than by adding the soap ready made, and since glycerin tends to soften the mass the fatty acids are preferable. Stearic acid gives better results than either oleic or elaidic acids. By heating 9 ozs. of petroleum with 1 oz. of stearic acid on a water-bath, and adding sufficient soda lye to neutralize, agitating with an egg-beater, a granular, opaque, white, firm mass is obtained. Sodium silicate gives a pure white, pearly, hard mass, and sodium aluminate gives a translucent hard mass. Oleic acid makes soft soaps and beeswax a soap of the consistency of vaseline. Cocoanut and castor oils give good results with soda lye. Potash lye is inferior and rosin soap a failure, as well as elaidic acid.

(2) *With Vegetable Saponifiers.* Quillaia bark is stated to give good results by adding to the petroleum 5 per cent. of finely powdered bark and 5 per cent. of water, and shaking or beating, when a white, opaque jelly is formed.—Chem. Drug., Nov. 1891, 671.

*Petroleum—Use.*—Dr. Trousseau recommends common petroleum in conjunctivitis, to be applied with a soft camel's-hair brush on the inside of the lid.—Chem. and Drug., July 25, 1891, 104.

*White Petrolatum.*—C. D. Hardy tried many methods of bleaching petrolatum, by the action of acids, sulphurous acid, boneblack, chlorine, potassium permanganate, the sun, and potassium bichromate with hydrochloric acid, but none of these gave a better result than a yellowish brown mass, most of them a blackish mass. Finally he tried mixtures of paraffin and paraffin oil, and found that a 50 per cent. mixture in color, general consistence and fusing point was very much like the best market sample of white petroleum. The only trouble was in managing the cooling of the melted mass so as to obtain a homogeneous mass.—Western Druggist, 1892, 6.

*Ozokerite.*—Ozokerite is a more widely distributed mineral than is generally supposed. There are places in England, Austria, Germany, Asia, Egypt and North America, where it is found more or less abundantly; but it is from Boryslaw, in Galicia, that most is obtained. Boryslaw is a peculiar town of 10,000 inhabitants, situated on the northern slopes of the Carpathians. About 100 individuals have rights to little bits of land over the ozokerite district, and each person mines his own little plot with the

help of his wife and children, and a workman or two. The ozokerite is sometimes soft, but may be as hard as gypsum, and is generally associated with rock salt. It ranges in density from sp. gr. 0.850 to 0.950, and melts at from 58° to 100° C. Ozokerite is at times very soft; in one shaft, called the asparagus shaft, when a pick is put into a thin layer of sandstone, the underlying ozokerite immediately begins to grow up through the hole like asparagus, and keeps growing as the "shoots" are broken off. The ozokerite is first hand-picked to free it from earthy matter, then washed with cold water, whereby the earth sinks and the ozokerite rises. The earth is next thrown into hot water, whereby a little more of the wax comes to the surface, and finally about 1 per cent. can be separated by the use of benzin and steam. The purified ozokerite is known as ceresine, and is obtained by treating the crude mineral with fuming sulphuric acid, and filtering through charcoal (the carbonaceous residue from the manufacture of potassium ferrocyanide). Ceresine is of a pale-yellow color, and the melting point is from 61° to 78° C. In addition to ceresine there are obtained from the crude mineral 3 per cent. of naphtha, 6 per cent. o semi-solid "ozokerine" (a vaseline-like substance), 12 per cent. of soft paraffin (melting point from 44° to 46° C.), and there remains a black wax, which may be used instead of the old style heel-ball of the shoemakers, but chiefly, mixed with india-rubber, for making an electric insulating material "okonite."—Am. Drug., 1892, 40, from Chem. Drug.

*Naphthoic Acids.*—By A. G. Ekstrand.—Journ. Chem. Soc., Aug. 1891, 932, from J. prakt. Ch. (2), xliii., 409–432.

*Naphthol—Distinction between Alpha- and Beta-Naphthol.*—Yvon proceeds as follows:

To 10 c.c. of the saturated aqueous solution of naphthol is added:

(1) Alcohol 2 c.c., nitric acid 2 c.c., nitrate of mercury 10 drops.

To another portion of 10 c.c. is added:

(2) Alcohol 2 c.c., concentrated solution of potassium nitrate 3 drops, sulphuric acid 10 drops.

*Alpha-naphthol* shows the following reactions:

| (1.) | (2.) |
|---|---|
| The yellow color of the mixture is not altered on boiling. | The reddish-brown color turns brown on boiling. |
| Chloroform is colored yellow, ether yellowish-green. | Chloroform is colored greenish-brown, ether yellowish green, and the liquid assumes a light wine-color. |
| Gun-cotton is dyed yellow. | Gun-cotton is dyed dirty-yellow. |
| Sulphurous acid renders the mixture turbid at once, and a red precipitate is separated. | Sulphurous acid colors the mixture dirty-green, but does not cause a precipitate. |

*Beta-naphthol* shows the following reactions:

| (1.) | (2.) |
|---|---|
| The intensely orange-yellow color turns at once to orange-red, and is not altered on boiling. | The intensely reddish-violet color is not altered on boiling. |
| Chloroform is colored ruby-red, ether yellow. | Chloroform is colored greenish-yellow, ether yellow. |
| Gun-cotton is dyed pink. | Gun-cotton is dyed wine-red. |
| Sulphurous acid colors the mixture pink, which color disappears slowly, and a yellow to black precipitate is formed. | Sulphurous acid destroys at once the red color of the mixture, but does not cause a precipitate. |

—Zeitschr. Analyt. Chemie, 1891, xxx., 489.

*Naphthol—Alpha and Beta—Distinction.*—Demandre distinguishes between these two by their behavior toward salol. Alpha-naphthol quickly forms an oily substance, while beta-naphthol remains unaltered.—Drug. Circ., 1891, 150.

*Naphthol—Alpha and Beta—Distinction.*—F. W. Richardson, being dissatisfied with Yvon's test, just mentioned, bethought himself of the difference between the two azo-dyes, "Orange I and Orange II," which is due to the fact that alpha-naphthol is used in the preparation of the former, while for the latter beta-naphthol is required. He worked out the following process: Dissolve 5 cgm. of sulphanilic acid in a little water containing about 5 c.c. of normal soda; add 5 c.c. of normal sulphuric acid, and mix with 2 cgm. of sodium nitrite dissolved in a few drops of water. Dissolve 4.5 cgm. of the naphthol in question in water by the aid of 0.5 c.c. of normal soda, and into this solution pour the diazotized sulphanilic acid. With alpha-naphthol the liquid becomes dark blood-red; with beta-naphthol only a reddish-yellow color is produced. The alpha color becomes dark-brown with dilute sulphuric acid, while the beta-color remains quite unchanged.—Chem. News, 1892, lxv., 18.

*Naphthol - Distinction in Urine.* See under *Urine*.

*Benzonaphthol.*—Yvon and Berlioz prepare this compound, which is a benzoate of beta-naphthol, by the interaction of betanaphthol with benzoyl chloride, the effect of which is, that the benzoyl group ($C_7H_5O$) takes the place of a hydrogen atom in the beta-naphthol. Its constitution is therefore $C_{10}H_7.C_7H_5O.O$. The resulting product is obtained in white microscopic crystals; it is odorless, almost insoluble in water, soluble in rectified spirit (3 grains to the oz.), and in chloroform (1 : 3). In the intestinal tracts it is decomposed into beta-naphthol, which remains in the intestines, and benzoic acid, which is excreted through the kidneys, partly as hippuric acid. Dissolved in chloroform, and boiled with a little potassa, a blue color must not at once appear (free naphthol); the presence of which is also indicated by dissolving benzonaphthol in hot alcohol, adding an equal vol-

ume of nitric acid, then a few drops of an acid solution of mercuric nitrate, when a cherry-red color will appear. It is best given in powders, or a shake-mixture.—Pharm. Post, 1891, 1006; Chem. Drug., Nov. 1891, 781; from Rep. de Pharm., 1891 (497), 479.

*Hydronaphthol—Administration.*—J. M. Clarke has found that hydronaphthol has a very distinct retarding influence on the digestion of egg-albumen by peptic fluids, a very slight effect on the digestion of milk by the same, and no effect at all on pancreatic digestion of milk or albumen, nor on the conversion of starch into sugar. It will be well to bear these peculiarities in mind when administering it.—Yearbook Pharm., 1891, 234; from Chem. Drug., 1890.

*Naphthalin—In Whooping-cough.*—Dr. Chavernac speaks highly of the use of naphthalin in whooping-cough. It is fused, and the vapor allowed to diffuse in the room. It is contra-indicated in beginning tuberculosis, inciting to cough.—Pharm. Zeits. Russl., 1892, 11; from Therap. Monatsh., 1891, 639.

*Naphthalin-Camphor.*—According to J. Girard, naphthalin forms with camphor a compound which is fluid at 35° C., and appears to consist of 10 parts of $C_{10}H_{16}O$ and 7 parts of $C_{10}H_8$. He further states that by melting together the two substances, and allowing the mass to cool to 30° C., a product is obtained which melts at 32.6° C. and solidifies at 23° C. It sublimes with partial decomposition, boils at 207° C., and distils so that less camphor than naphthalin goes over. It dissolves iodine and gun-cotton.—Apoth.-Zeitg., 1891, 437; from Jour. Pharm. Chim.

*Asaprol.*—This name has been given to a new crystalline antiseptic and antipyretic, introduced by Stackler and Duleif. Chemically it is calcium beta-naphthol-alpha-monosulphonate, and the formula is $Ca(C_{10}H_6.OH.SO_3)_2.3H_2O$.—Pharm. Centralh., 1892, 320.

*Thiopene Derivatives.*—Dr. Spiegler recommends *thiophene-sulphonic acid* for prurigo in the form of a 10 to 20 per cent. ointment with equal parts of lanolin and vaselin as a base. This acid is a white crystalline powder, containing 33 per cent. of sulphur. *Sodium thiophene-sulphonate* is to be preferred in cases of prurigo complicated by eczema.

*Thiophene Biniodide* is analogous to iodol, and forms a crystalline powder of a peculiar aromatic, not disagreeable odor. It contains 75 per cent. of iodine and 9 per cent. of sulphur. It is insoluble in water, but soluble in hot alcohol, in ether and chloroform. Dr. Hock recommends it in the form of powder or gauze as a substitute for iodoform.—Am. Jour. Pharm., 315, from Rep. Pharm., 1892, 157.

*Sodium Thiophene-sulphonate.*—$C_4H_3SNaSO_3$ is superior to naphthol in prurigo if applied in the form of a five to ten per cent. ointment (lanolin and vaselin equal parts, as the base). This compound is a white crystal-

line powder containing 33 per cent. sulphur, of which one-half is directly combined with carbon. The lead salt can be used in the same manner, but it will cause a burning sensation lasting for several minutes.—Am. Jour. Pharm., 1892, 190, from Pharm. Zeitg., 1892, 106.

*Di-iodothiophene.*—This substance is proposed by E. Spiegler as a substitute for iodoform; it has been found effective in preventing pus-formations. It has the formula $C_4H_2I_2S$, and contains 75.5 per cent. iodine and 9.5 per cent. sulphur directly in combination with carbon; it forms tabular crystals, easily volatilized, melting point 40.5° C. The odor is stated to be rather aromatic; it is insoluble in water, slightly soluble in cold alcohol, but easily soluble in warm alcohol, ether and chloroform. A ten per cent. gauze is made by saturating gauze with the following solution: Di-iodo-thiophene 50.0, alcohol and ether, of each 500.0, glycerin 10.0; an addition of 2.0–3.0 of a saturated alcoholic solution of saffranine is recommended to indicate the uniform distribution of the solution upon the gauze.—Am. Jour. Pharm., 1892, from Pharm. Zeitg., 1892, 106.

*Iodo-β-naphthol.*—Braille has introduced a compound of the aristol class, which he prepares by mixing an aqueous solution of 24 gm. of iodine and 27 gm. of potassium iodide with an aqueous solution of 110 gm. of beta-naphthol and 40 gm. of caustic soda, and adding to the mixture gradually a solution of sodium hypochlorite corresponding to ten times its volume of chlorine. The iodo-naphthol is precipitated as a greenish-yellow powder, which is washed and dried in the dark. It is stated to be odorless and tasteless, insoluble in water, almost insoluble in alcohol and acetic acid, partially soluble in ether, and very soluble in chloroform.—Pharm. Jour. and Trans., Nov. 1891, 426; from Union Pharm., 1891, 437.

*Tonquinol.*—The assertion that the artificial musk (tonquinol) loses its odor on mixing with sulphate of quinine, and that it might be distinguished in this manner from the genuine musk, is, according to N. Wender, incorrect. (The reporter learned over forty years ago that powders of sulphate of quinine and musk would lose the musky odor in a short time). Wender states that tonquinol loses its odor in contact with boiling water. —Pharm. Post, 1891, 1069.

*Tonquinol—Artificial Musk.*—According to F. Valentiner's patent, equivalent quantities of oil of turpentine and isobutyl alcohol are mixed and added to 5 or 6 times the volume of concentrated sulphuric acid, in small quantities at the time and keeping the mixture well cooled. After one or two hours the whole mixture is poured into 5 to 10 times the volume of fuming nitric acid, and after complete nitrification poured into much water. The "tonquinol" separates in light-yellow flakes, which are collected on a filter and washed until neutral reaction. It melts at 70° C. Pharm. Centralhalle, 1891, 459.—Am. Jour. Pharm., 1891, 462.

*Tumenol—[Derived from Bitumen.]*—According to Dr. Spiegel, all

mineral oils contain a class of unsaturated hydrocarbons capable of being converted by sulphuric acid into still less saturated derivatives; these hydrocarbons are said to constitute the mother substance of tumenol. The mineral oil is first treated with soda, to remove phenols and acids, and afterwards with 70 per cent. sulphuric acid, to remove bases and pyrrol-like bodies. Upon treating the purified oil with concentrated sulphuric acid, the unsaturated hydrocarbons undergo sulphonation with evolution of sulphur dioxide, and a dark-colored acid syrup is formed, from which, by washing with water and solution of sodium chloride, a mixture of sulphone and sulphonic acid is separated. This mixture is treated with soda solution, when sodium tumenolsulphonate is formed, and then with ether, which takes up the sulphone, leaving the sodium salt behind. The tumenol-sulphone (also called tumenol oil) after purification forms a dark-yellow, thick liquid, insoluble in water but soluble in ether, ligroin and benzol; the formula is approximately $(C_{41}H_{67}O)_2SO_2$. On decomposing the sodium tumenol-sulphonate with hydrochloric acid, tumenolsulphonic (or sulpho-tumenolic) acid is liberated, and is what for the sake of brevity is named, tumenol. It is a dark-yellow powder, with a peculiar, faintly bitter taste, soluble in water; its salts, excepting those with mercury and antimony, are insoluble in water. Tumenol (the acid) converts mercuric chloride into mercurous on boiling, and reduces ferric chloride to ferrous. The commercial tumenol contains both the acid proper and tumenol-sulphone. Neisser states that tumenol will be found useful in moist eczema, erosions, excoriations and pruritus.—Phar. Jour. and Trans., Nov. 1891, 425; from Deutsche Med. Woch., 1891, 1238.

*Vaselin—Detection of Fats.*—Vizern and C. Nicolas have determined that 10 gm. of the fatty compounds absorb 1.635 gm. of potassium oxide ($K_2O$), and base their calculations on this. A standard alkali solution is prepared by dissolving about 20 gm. of potassa in 100 c.c. of 90 per cent. alcohol. This is standardized with normal sulphuric acid.

A neutral alcohol is prepared by dissolving 1 c.c. of phenolphthalein in 500 c.c. of 90 per cent. alcohol, then alkali is stirred in drop by drop until a very slight rose tint is produced. Ten gm. of the vaselin to be tested are placed in a 200 c.c. porcelain basin, 10 c.c. of standard alkali added, the basin being kept on a water-bath during the whole process; 50 c.c. of neutral alcohol are now added, the solution heated nearly to boiling, and the mixture stirred for eight minutes, when the saponification will be complete, and normal sulphuric acid added drop by drop until *all color* has disappeared. This point is very important. If too long a time has been taken it may be necessary to add a fresh portion of neutral alcohol to replace the loss by evaporation. The amount of sulphuric acid run in, subtracted from that required to saturate 10 c.c. of alkali solution, multiplied by 0.0047, gives the quantity of potash absorbed by the fats in 10 gm. of vaseline, and this number divided by 0.0163 gives the percentage

of fats in the vaselin.—Am. Drug., 1892, 12; from. Jour. de Pharm. et de Chim., 1891, ii., 49.

ALCOHOL, ETC.

*Denaturated Alcohol*, detection of *acetone*. See under *Acetic Acid*.

*Alcohol—Estimation*.—Both R. Benedikt and L. Gruenhut state that the method of Roese with potassium permanganate and sulphuric acid (see Proceedings 1889, xxxvii., 613,) is unreliable.—Zeits. analyt. Chem., 1891, xxx., 720, from Chem. Zeitg., xv., 44, 847.

*Alcohol Fermentation—Action of Antiseptics*.—E. Biernatzki has studied the action of antiseptics upon the alcoholic fermentation, and found that while at a certain concentration they prevent fermentation, they in a great dilution promote it. He gives the following table:

| ANTISEPTIC. | The lowest concentration which prevents fermentation. | The dilution which promotes the fermentation. |
|---|---|---|
| Mercuric chloride | 1 : 20,000 | 1 : 300,000 |
| Potassium permanganate | 1 : 10,000 | 1 : 100,000 |
| Cupric sulphate | 1 : 4,000 | 1 : 600,000 |
| Bromine | 1 : 4,000 | 1 : 50,000 |
| Thymol | 1 : 3,000 | 1 : 20,000 |
| Benzoic acid | 1 : 2,000 | 1 : 10,000 |
| Salicylic acid | 1 : 1,000 | 1 : 6,000 |
| Quinine | 1 : 400 | 1 : 80,000 |
| Carbolic acid | 1 : 200 | 1 : 1,000 |
| Sulphuric acid | 1 : 100 | 1 : 10,000 |
| Resorcin | 1 : 100 | 1 : 2,000 |
| Pryogallol | 1 : 50 | 1 : 4,000 |
| Boric acid | 1 : 25 | 1 : 8,000 |
| Chloral hydrate | 1 : 25 | 1 : 1,000 |

—Pharm. Zeitg., 1891, 670.

*Origin of the Higher Alcohol in Commercial Spirits*.—L. Lindet states that fermentation of sugar and of commercial "maltose," with a large quantity of yeast (80 per cent. of the sugar) yields a product containing a much smaller proportion of the higher alcohols than fermentation with a small quantity of yeast (20 per cent. of the sugar). Acceleration of fermentation by addition of brewer's grains has a similar effect, the proportion of the higher alcohols being distinctly reduced. Previous experiments showed that the lower the temperature at which fermentation takes place, the lower the proportion of the higher alcohols.—Jour. Chem. Soc., July, 1891, 813; from Compt. rend., cxii., 663.

*Alcohol—Estimation of Fusel Oil*.—Roese estimates the amount of fusel oil in alcohol by means of chloroform; he found that alcohol containing even traces of fusel oil increases the volume of chloroform much more than the same amount of alcohol minus the fusel oil. The best instrument de-

vised for applying this test is that of Windisch-Herzfeld. The procedure is simply to shake the alcohol (previously diluted to 30 per cent.) with a certain proportion of chloroform and a little sulphuric acid (which latter is added to cause a more rapid separation of the chloroform), and read off the volume of chloroform. Sell has computed a table showing the amount of fusel oil corresponding to the increase in volume of the chloroform. For illustration of the apparatus and details of manipulation, reference must be had to Am. Drug., 1891, 349. See also Zeits. analyt. Chem., suppl. to 1892.

*Alcohol—Trimethylethyl.*—$CMe_3.CH_2.OH$—(*trimethylcarbincarbinol*). Preparation by reducing trimethylacetic chloride with sodium amalgam.—L. Tissier.—Jour. Chem. Soc., Sept. 1891, 998; from Comptes rendus, cxii., 1065.

*Fusel Oil—American.*—According to J. H. Long and C. E. Linebarger, American fusel oil consists chiefly of active and inactive amyl alcohol with some isobutyl alcohol and isopropyl and ethyl alcohols, and traces of normal propyl and normal butyl alcohols.—Yearbook Pharm., 1891, 28, from Chem. News, lxi., 185–187.

*Amylene—Halogen Derivatives.*—J. Kondakoff gives the result he arrived at, and expresses the chlorination of amylene by the formulæ: (1) $C_5H_{10}+Cl_2=C_5H_{10}Cl_2$; (2) $C_5H_{10}Cl_2-HCl=C_5H_9Cl$; (3) $C_5H_{10}+HCl=C_5H_{11}Cl$. Hence those amylenes, and generally olefines, which combine easily with mineral acids, yield unsaturated monochlorides; those which do not combine easily give additive products with chlorine.—Journ. Chem. Soc., July 1891, 809, from Ber., xxiv., 929.

*Brandy.*—O. Malmros, U. S. consul at Cognac, says that the cognac brandy is divided into two principal classes, "the champagnes," made from wine grown upon the plains cultivated from remote antiquity, and the "bois," grown on territory which until the present century mostly abounded in trees; this last is subdivided into "premiers," "fin," "bons," "ordinaire," and lastly "à terroir," which, on account of its strong, unpleasant taste, cannot be employed except in very small proportions for blending with other brandies, without injury to their flavor. The sandy, waste district producing this most inferior brand, he says, has suffered but little from the phylloxera, while in the remainder of the "bois" district its ravages have been formidable; but the vineyards of the "champagne" country have been entirely destroyed, and no champagne brandy has been distilled since the year 1878, when the phylloxera first made its appearance in the valley of the Charente river.—Am. Drug., 1891, 348.

*Brandies and Liquors of Commerce—Examination.*—Ed. Mohler expresses the acids as acetic acid, after determination with decinormal potassa. The ethers are expressed as ethyl acetate, and determined by

saponification with decinormal potassa. The aldehyds as ethylic aldehyd, and determined colorimetrically after treatment with rosanilin bisulphite by comparison with a solution of aldehyd (1 : 20,000). The higher alcohols are expressed as isobutylic alcohol (or amylic alcohol in case of industrial alcohols), and determined by the color reaction of sulphuric acid upon alcohol freed from aldehyds by means of aniline diphosphate and a colorimetric comparison with a solution of amylic or isobutylic alcohol (1 : 5000). The nitrogenous products are estimated as ammonia.—Chem. News, July 31, 1891, 61; from Bull. Soc. Chimique, v., No. 10; Am. Jour. Phar., July 1891, 358.

*Whisky.*—C. Richardson reports on the whisky as it is usually drunk in the United States. He says that very few straight whiskies are sold as such in America, it having been found desirable, from a commercial point of view, to mix the products of different mashes, to add flavoring materials, and often to reduce the strength with water. The average of the commercial samples contain over twenty times as much total solids as the natural ones.—Am. Drug., 1891, 348.

## ALDEHYDE.

*Aldehyde—Test.*—L. Crismer states that aldehyde and allied bodies produce with Nessler's reagent a yellowish precipitate, which gradually darkens, and can be distinguished from the precipitate caused by ammonia by the addition of potassium cyanide, which dissolves the ammonium precipitate, but turns the aldehyde precipitate black.—Yearbook Pharm., 1891, 129; from Zeits. analyt. Chem., xxix., 350.

*Aldehyde—Reaction.*—According to H. Borntraeger the reducing action of aldehyde on ammoniacal silver solution and on ammoniacal permanganate, are the only certain tests at present known, but they both require the presence of a moderately large amount of aldehyde.—Jour. Chem. Soc., Sept. 1891, 1142; from Zeit. analyt. Chem., xxx., 208.

*Furfuraldehyde—Detection.*—The substance is either submitted to dry distillation in a perfectly clean test tube, or it is carefully heated with a small excess of concentrated sulphuric acid; in either case, the presence of furfuraldehyde in the vapor is ascertained by its reddening paper charged with an aniline or xylidine salt; or the furfuraldehyde may be identified in solution by the use of well-known reagents, such as alphanaphthol, phloroglucinol, etc.—E. Nickel, Jour. Chem. Soc., July 1891, 867; from Chem. Zeitg., xiv., 836.

## ETHYL.

*Ethereal Salts of Unsaturated Acids—Action of Sodium Alkylates.*—A purely chemical paper by T. Purdie and W. Marshall, recording experiments to ascertain whether the ethereal salts of unsaturated acids can be converted into saturated compounds by union with the elements of alco-

hol through the agency of small quantities of sodium alkylates. The acids being: Fumaric, maleic, acrylic and crotonic.—Journ. Chem. Soc., July 1891, 468–483.

*Oleum Æthereum.*—F. B. Power raises the question whether this preparation should be retained in the Pharmacopœia or be dismissed. He shows by a review of the literature on the subject, from Hennel's discovery, in 1826, down to recent times, that oleum æthereum is an exceedingly unsatisfactory preparation, not only because of its small yield (a good deal less than 1 per cent. of the alcohol employed), but chiefly on account of its indefinite and probably variable chemical character, and the complete lack of information as to which of its constituents represents its assumed medicinal virtues. In addition to this, the chemical composition of the heavy oil of wine as usually sold in commerce differs greatly from that made by the pharmacopœial process, and consequently what beneficial action it may have been found to possess is due to an unknown or a combination of little known substances, but hardly to any of the component parts of the strictly officinal article. Power says in conclusion that if it can be demonstrated that the true ethereal oil possesses such pronounced medicinal virtues that it cannot be substituted by more definite chemical compounds, it would seem imperative that its constituents should be accurately identified and subjected to a careful physiological study. On the basis of such experiments it ought to be possible for the chemist to devise a rational method for the preparation of the respective active compound, and to establish standards for its identity and purity.—Pharm. Rundschau, 1891, 263–268.

*Acetic Ether—Comparison of Commercial.*—Robert Glenk compared seven samples with an absolute ether made by himself. The latter was prepared by decomposing dried acetate of sodium with concentrated $H_2SO_4$ and alcohol, the distillate was thoroughly washed with water containing 25 per cent. of calcium chloride (the ether being less soluble in this mixture than in water alone), and the washing repeated five times to remove the alcohol present; then digested with fused chloride of calcium to free it from water, and finally distilled over anhydrous acetate of sodium on a water-bath. The separation of the last trace of alcohol is very tedious and wasteful; the author therefore started from sodium ethylate: 150 parts of dried sodium sulphethylate were decomposed by 85 parts of dried acetate of sodium and about 20 parts of $H_2SO_4$, and the ether distilled off from the sulphate of sodium, condensing it in a receiver surrounded by ice. This ether had an acid reaction from the presence of free acetic acid, but was entirely free from alcohol. After freeing it from acid by shaking it with a few crystals of potassium bicarbonate, it was washed with a 3 per cent. solution of potassium permanganate, then digested with half its weight of fused chloride of calcium, decanted and distilled over anhydrous acetate of sodium. This ether had a sp. gr. of

.8893 at 15.5° C., and a boiling point of 72° C. It had a neutral reaction and dissolved in 11 parts of water at 16° C. It is clearly miscible in any proportion with chloroform, ether, petroleum ether (40° C.), benzol, benzin, fixed and volatile oils, liquid petrolin and glacial acetic acid; also in 2½ times its volume of carbon bisulphide, but only very slightly in glycerin. It dissolved iodine and bromine freely, sulphur and phosphorus with difficulty. Quinine, cinchonine, strychnine, tannin, pyroxylin and resins are also freely soluble in the ether. Alkalies decompose it into acetic acid and alcohol. In the following table number 1 is the "sodium ethylate" ether, No. 2 is of German origin, marked "absolute C. P;" the remainder are domestic specimens obtained from various sources.

*Reaction*, Nos. 1 and 2 neutral; five, domestic, acid; one strongly acid.

*Spec. grav.* at 15.5° C., .8893; .886; .878; .877; .875; .857; .877; .886.

*Boiling point*, 75° C.; 70° C.; 71.5° C.; 72° C.; 72.5° C.; 75° C.; 74° C.; 75° C.

$H_2SO_4$, 1.82, all colorless except one, which was rendered pinkish.

*Residue on evaporation*, none.

*Test sol.* of $AgNO_3$, no reaction.

*Test sol.* $BaCl_2$, two domestic: one slightly and one very turbid; the remainder not affected.

*Sol. in benzol*, Nos. 1 and 2 clear; four samples cloudy and two very cloudy.

*Sol. in equal vol.* of $CS_2$, as the foregoing.

*Odor on supersaturating with dil.* $H_2SO_4$, two of the domestic a butyric odor, two empyreumatic odor, and the remainder none.

*One per cent. sol.* $K_2Mn_2O_8$, two domestic destroyed the color, the remainder did not affect it.

Shaking 10 c.c. in a graduated tube with 10 c.c. of water at 15.5° C., the following separations took place: 9.2, 8, 3, 7, 6.5; three did not separate.—Am. Jour. Pharm., Aug. 1891, 395–399.

*Ethyl Bromide—Purity.*—(Ethylene bromide? Rep.)—An examination of an article made by the German Pharmacopœia process, proved that it contained an impurity which had a very irritating effect upon the nose and eyes before it was purified by treatment with sulphuric acid; by fractioning 100 kilos, there was obtained 500 grams of a difficultly volatile substance, which after purification yielded a fraction boiling at 150–151° C., and which was identified as *bromoform;* the very irritating substance was later isolated and found to be *mono-brom-acetone.* These impurities originate from an impure alcohol (*denaturized* by addition of pyridine) containing acetone, which latter is acted upon by bromine liberated from the hydrobromic acid employed. If the ethyl-bromide be very thoroughly purified by the action of sulphuric acid, it can be kept for a long time, an

occasional opening of the bottle not tending to decompose it; cork stoppers, however, should not be used, since this promotes decomposition.—Am. Jour. Phar., 1892, 143; from Schweiz. Woch.-Schr., 1892, 3.

*Ethyl Bromide—Danger.*—Dr. John H. Brinton is not at all enthusiastic about its use. He calls attention to several peculiar phenomena at times manifested during its use; especially a tendency to muscular rigidity and the degrees and violence of arterial hemorrhage.—Drug. Circ., 1892, 125; from Therapeut. Gazette.

*Ethylene Bromide—(not to be confounded with Ethyl Bromide)*—is introduced by Dr. Donath as a remedy for epilepsy, given in doses of 0.1 to 0.3 gm. three times a day. Being insoluble in water, it is best given in emulsion, or alcoholic solution largely diluted with milk before taking, or in gelatin capsules with oil of sweet almonds.—Am. Jour. Pharm., July 1891, 345, from Pharm. Ztg., 1891, 322.

*Ethylene Bromide* is a light, brownish liquid, with a chloroform-like odor and a sweetish, afterwards burning taste. It boils at 300° C., solidifies at 0° C., has the specific gravity 2.163, and contains 90.9 per cent. of bromine. It is insoluble in water, but easily in alcohol and oils.—Am. Drug., 1891, 271.

C. Rédard speaks highly of *chloride of ethyl* as a local anæsthetic. It is a colorless, mobile liquid, sp. gr. 0.9214, slightly soluble in water, but readily in alcohol.—Chem. Drug., Sept. 1891, 483.

*Ethylamine and Propylamine—Selenium and Sulphur Derivatives.*—Virgil Coblentz has written an inaugural thesis on the above subject, for which the readers are referred to Pharm. Record, 1891, xii., 205, 221, 322.

*Spiritus Aetheris Nitrosus.* See under *Spiritus* "Pharmacy."

*Bromoform—Preparation.*—A. Scherer, on theoretical grounds, proposes to make bromoform from calcium hypobromite: 65 parts of the hypobromite, 10 parts of alcohol, 150 of water, and 10 parts of slaked lime, are placed in a flask and subjected to distillation. The lower layer could be freed from bromine by potassa, dried with calcium chloride, and rectified.—Western Druggist, 1891, 368, from Proc. Illinois Ph. Association.

*Bromoform—Administration.*—In ordinary mixtures the bromoform usually separates as a globule, which can scarcely be kept long enough suspended on shaking to allow of an even apportioning of the doses. P. W. Bedford suggests the following mixture, which keeps the bromoform perfectly dissolved:

| | |
|---|---|
| Bromoform | 16 minims. |
| Alcohol | 2 fl. dr. |
| Glycerin | 12 fl. dr. |
| Tincture of cardamom comp. | 2 fl. dr. |

Mix in this order.

—Pharm. Record, 1892, xiii., 85.

*Chloral Hydrate—Precaution.*—Mixtures containing both borax and chloral hydrate are sometimes prescribed. M. A. Dujardin points out that on adding chloral hydrate to a hot solution of borax, formation of chloroform takes place; he therefore recommends to wait with the addition of chloral hydrate until the solution of borax has cooled.—Zeits. Oesterr Apoth. Ver., July 1891, 346, from Bull. Commerc., 1891.

*Chloral hydrate—Use.*—Spohn speaks highly of a solution of 20 parts of chloral hydrate in 90 parts each of glycerin and water, to be applied locally in anthrax. This treatment is stated to make incisions superfluous.—Zeits. Oester. Apoth. Ver., 1891, 432, from Sem. Méd.

*Chloroform—Freed from Aldehyde.*—According to Crismer both chloroform and ether can be freed from aldehyde by treating them with Nessler's reagent, and then distilling them.—Zeits. analyt. Chem., xxix., 351.

*Chloroform—Volumetric Estimation.*—L. de Saint-Martin recommends a method, based on the transformation of chloroform into formiate of potassium and potassium chloride by the action of a concentrated alcoholic solution of potassa. Although the reaction requires in the cold 150 hours, at 100° C. only 3 hours will be necessary. The author has not succeeded in converting more than 99.1 per cent. of the chloroform.

$$CHCl_3 + 4KOH + HCOOK = 3KCl + 3H_2O.$$

Ten c.c. of chloroform water, 2 c.c. of very concentrated solution of potassa and 20 c.c. of alcohol are heated in a closed glass tube for three hours in a boiling water-bath. After cooling, the contents are transferred to a beaker, one drop of phenolphthalein added, and neutralized exactly with quarter-normal sulphuric acid; and after being cooled completely the chlorine is determined with argentic nitrate, according to Mohr, using potassium bichromate as an indicator. In calculating the chloroform from the chlorine found, it will be necessary to add to the result obtained 0.9 per cent. The presence of alcohol and potassium formiate do not influence the titration if it is performed in the cold.—Zeitschr. analyt. Chemie, 1891, xxx., 497.

*Chloroform—Pictet's.*—J. F. Macfarlan & Co. have examined a sample of Pictet's chloroform, taken directly from an original package. The sp. gr. was 1.485 at 60° F., pointing to the presence of a considerable quantity of something other than chloroform. Subjected to fractional distillation, it began to boil at 61.5° C., rising almost immediately to 62° C.

When 7.7 per cent. had distilled over, the temperature was 63° C.
When 34.6 per cent. had distilled over, the temperature was 63.5° C.
When 84.6 per cent. had distilled over, the temperature was 64° C.

The residue, which had a distinctly bad odor, was transferred to a clean, dry bottle, and evaporated at a temperature of from 80° to 90° F. A rancid-smelling residue was left. Pictet's chloroform, according to this

examination, does not appear to be better than a good quality of the commercial article.—Phar. Jour. and Trans., Dec. 1891, 548.

Raoul, Pictet & Co. (Berlin), deny the correctness of the deductions of Macfarlane & Co., and suggest that the chloroform, stated to have been Pictet's, had been tampered with. This Macfarlan & Co. deny, having procured the original bottle from the agents of the Berlin manufacturers. —Phar. Jour. and Trans., Jan. 1892, 608, 628.

*Chloroform—"Pictet."*—Kinzel has examined chloroform made by Pictet's process and considered the purest made, and found that it does not differ from the purest commercial chloroform. It decomposes in the sunlight quite easily within a few hours, with the formation of $COCl_2$.—Phar. Centralh., 1891, 518.

*Chloroform—Impurity.*—D. Brown, in criticizing the tests for impurities as given in Brit. Pharm., points out that the impurities have boiling points both above and below that of pure chloroform, and as a rule they possess very strong and characteristic odors, which even in a very dilute form can be detected more readily by the nose than by any known chemical reagent, and further, that if the impurities found in the chloroform are dangerous to life, there is a greater likelihood of the more volatile ones doing mischief than the less volatile, seeing that the former will evaporate and be inhaled with the chloroform, while the latter to a very large extent are left behind when the chloroform has evaporated. Brown recommends to fractionate carefully, one fraction of 10 per cent., the other 75 per cent., and a residue of 15 per cent.; in this way both the more and the less volatile compounds are obtained in a concentrated form; and the residue is slowly evaporated at a temperature of from 80° to 90° F., with due precaution to exclude dust, and weighed.

Seven samples of commercial chloroform, which were found to answer all the tests of Ph. Brit., were treated in the manner just described with the following results:

| No. | 10 per cent. fraction. | 15 per cent. residue. | Residue evaporated. Parts by weight. |
|---|---|---|---|
| 1........ | No bad smell. | No bad smell. | 1 : 1,946,100. |
| 2........ | " " | " " | 1 : 487,500. |
| 3........ | " " | " " | 1 : 487,500. |
| 4........ | " " | " " | 1 : 487,500. |
| 5........ | " " | " " | 1 : 390,000. |
| 6........ | " " | " " | 1 : 121,875. |
| 7........ | " " | " " | 1 : 243,750. |

Samples 2, 3, 4 were prepared from alcohol, acetone, and methylated spirit respectively in the ordinary course of manufacture, thus showing that chloroform of equal purity can be and is prepared from these several substances.

Six other samples, none of which would answer the pharmacopœial tests of purity, although probably they would pass an ordinary inspection, behaved as follows:

| No. | 10 per cent. fraction. | 15 per cent. residue. | Residue evaporated. Parts by weight. |
|---|---|---|---|
| 1........ | Bad smell. | Very bad smell. | 1: 57,352. |
| 2........ | " " | No bad smell | 1: 324,999. |
| 3........ | Very bad smell. | Very bad smell. | 1: 243,750. |
| 4........ | Slight smell. | Bad smell. | 1: 121,875. |
| 5........ | " " | " " | 1: 324,999. |
| 6........ | " " | " " | 1: 390,000. |

Brown states that about 130 c.c. are required for this test, and that it would take from two to three days.—Pharm. Journ. Trans., March 1892, 769.

*Chloroform—Impurities.*—M. C. Traub states that in the fractional distillation of a large quantity of chloroform (made by use of bleaching powder) it was possible to separate a small fraction boiling between 57 and 59° C., and having a specific gravity of 1.185; this is believed to consist of ethylidene-chloride, along with some chloroform. Other impurities of the chloroform give rise to a blue or violet coloring matter upon agitation with sulphuric acid; also a principle developing a peppermint-like odor. It is possible by prolonged treatment with sulphuric acid to remove all of these impurities and obtain a chloroform which in no way is inferior to the chloroform of Pictet. An important matter is to decide between such pure chloroform and others of less purity; the results so far obtained warrant the following stringent sulphuric acid test: Equal volumes of chloroform and sulphuric acid (protected from light), agitated frequently during six to eight days, should show no change in color; after the chloroform has evaporated spontaneously from the separated sulphuric acid layer, the acid diluted with five parts of water should not show any change upon the addition of 1 c.c. $\frac{n}{10}$ silver nitrate solution. This test, it is needless to state, will only be complied with by a very pure chloroform. Another test which promises to be useful: 0.2 gm. metallic sodium and 5 c.c. chloroform placed in a glass-stoppered cylinder, and warmed and agitated frequently during two or three days, will give the following results: With a pure alcohol-free chloroform there is no change to be noted excepting that sodium chloride separates out in small white crystals. The presence of alcohol or other impurities causes a more energetic reaction, and the salt separates with a yellow or brown color; a number of samples of chloroform which answered the requirements of the German Pharmacopœia yielded, besides the colored separation of the salt, an odor of carbylamine indicating contamination with some nitrogenous

substance (to which may be ascribed the formation of the blue coloring matter upon treatment with sulphuric acid).—Am. Jour. Pharm., 1892, 144; from Schweiz. Woch.-Schr., 1892, 11.

*Chloroform—Purity.*—Biltz has subjected the whole subject of pure and impure chloroform to a thorough sifting, and published a monograph of which the following contains the essential results arrived at:

Biltz regards it as an established fact that the decomposition to which chloroform is liable does not result from the presence of certain impurities as has been assumed; but that it is a natural characteristic of chloroform. Consequently, whatever may be the source from which it is obtained, by whatever method prepared, and however perfectly purified, it is in all cases equally indispensable to adopt fitting precautions against the decomposition of which it is naturally susceptible. The purer the chloroform is, and the greater its freedom from alcohol, the more readily and the more rapidly does it undergo decomposition when exposed to light in vessels of white glass, in the presence of air. This decomposition is brought about by atmospheric oxygen displacing, under the influence of light, a portion of the chlorine, while at the same time there is a formation of phosgene gas and water. The protection afforded by alcohol is but limited. The joint action of air and light still causes decomposition, but while alcohol is present it takes up the prejudicial products of decomposition, forming with them products which are not only harmless, but even suitable for producing anæsthesia. When the alcohol has been exhausted in this way, the liberation of chlorine and the formation of phosgene gas are no longer counteracted. Chloroform absolutely free from alcohol will be decomposed within one or two hours in summer time in sunlight; in diffused daylight within one day; while in winter it may take ten days, according to the clearness of the atmosphere. As to the protection afforded by alcohol, Biltz finds that 1 : 400 prevents decomposition only for a few weeks or months. With 1 : 200 the preventive effect lasts for eleven months, and with 1 : 100 it continues much more than a year. He is of opinion that all statements made as to the keeping quality of certain kinds of chloroform point only to the circumstance of failure to detect the presence of alcohol to which the permanence of the chloroform was due.

Biltz tests for alcohol as follows: The chloroform is well shaken with half its volume of an acid solution of potassium bichromate (1 part of potassium bichromate dissolved in 2000 parts of distilled water, containing ⅙ of its volume of sulphuric acid), and then allowed to rest. With one per cent. of alcohol the chromic solution soon becomes paler in color, and at last appears quite colorless, since the green color of the chrome salt produced by the alcohol is not perceptible in that degree of dilution. With less than a quarter of one per cent. the reduction takes place much more slowly, and with a tenth of one per cent. an entire day is re quisite. In such cases the reduction of the yellow tint must be deter-

mined by comparison with a portion of the test solution in a second tube of the same diameter. When the chloroform is absolutely free from alcohol, the tint of the solution is not altered after several days. Lieben's iodoform test might also be used, by shaking the chloroform with water, separating the water, and adding to it a colorless solution of iodine in caustic potassa.

The following conclusions were arrived at respecting the behavior of chloroform to concentrated sulphuric acid:

(1) Chloroform, prepared from alcohol and chlorinated lime, and perfectly purified by concentrated sulphuric acid and completely freed from alcohol by copious washings with water, does not communicate any color to concentrated sulphuric acid either before or after its decomposition by air and light. (2) When chloroform that does not color sulphuric acid gives, after undergoing decomposition, a color to sulphuric acid, the result can only be due to the action of a product of the decomposition—especially free chlorine—upon some foreign substance, that is, either ethyl chloride or alcohol. If, therefore, in decomposing chloroform free from alcohol and in contact with a layer of sulphuric acid, a drop of alcohol be added, the free chlorine and the phosgene gas disappear immediately and the sulphuric acid is colored brown, owing to the alcohol having been converted into ethyl chloride. (3) When chloroform that is absolutely free from alcohol and that does not color sulphuric acid is left to undergo decomposition and the acid after that becomes brown, this coloration indicates the presence of ethyl chloride that has been converted by the free chlorine into a higher chlorinated product.

As to Pictet's chloroform, Biltz considers it to be the purest yet produced, which, of course, does not prevent it from becoming decomposed under the same circumstances as ordinary chloroform.—Pharm. Journ. Trans., June 1892, 1041, from Pharm. Centralh., 1892, 269.

*Formol.*—This name has been applied by Trillat to formaldehyde, $CH_2O$. It is obtained by oxidizing methylic alcohol by means of an ignited platinum wire; or, on the large scale, by passing the vapors of methylic alcohol over a live coal. The decomposed vapors are caught in a receiver filled with water; the liquid finally containing, besides formaldehyde, some undecomposed methyl alcohol and some formic acid. This liquid is then rectified, and the final aqueous solution of formaldehyde brought to a strength of 40 per cent.; at a higher degree of concentration, the compound becomes polymerized, trioxyformol or trioxymethylene being formed $(CH_2O)_3$, which is solid. Although unsuited for the antiseptic treatment of wounds, it may be used for the preservation of easily decomposable liquids, as urine.—Am. Drug., 1892, 132.

*Deodorized Iodoform.*—197 iodoform, 1 carbolic acid and 2 oil of peppermint are mixed.—Pharm. Centralh., 1892, 62.

*Iodoform Bougies.*—See under *Suppositoria.*

*Iodoform—Masking the Odor.*—W. Pagenkopf recommends for this purpose the addition of a little Russian oil of turpentine.—Am. Journ. Pharm., Aug. 1891, 404, from Ph. Ztschr. Russl., 1891, 391.

*Iodoform—Estimation.*—H. Droop Richmond makes use of the fact that iodoform, on being heated with alcoholic soda, splits up with the formation of sodium iodide, sodium formate and other substances, the proportions appearing to be that $16CHI_3$ require $42NaOH$, and give 35 NaI and $4KHCO_2$; the estimations made were as follows, for 100 parts iodoform:

| | *Found.* | *Calculated from above proportions.* |
|---|---|---|
| Soda | 26.4 | 26.6 |
| Iodine as iodide | 69.3 to 70.4 | 70.2 |
| Formic acid | 3.34 | 2.92 |

These figures show that the reaction is a complex one, and I have not attempted to construct an equation to express the changes which take place; with the assumption that for every 100 parts of iodoform, 70 parts of iodine are produced as iodide, a fairly reliable method of working is possible; about .1–.15 gram of iodoform or such quantity of the substance to be examined as will give that quantity, is weighed out and dissolved in alcohol, an excess of alcoholic soda is added, and after about ten minutes' digestion near the boiling point of the alcohol, the excess of alcohol is evaporated, the residue is taken up with water, made slightly acid with *dilute* nitric acid and a small quantity of calcium carbonate added to restore neutrality. The solution is then titrated with the solution of nitrate of silver used for water analysis (of which 1 c.c.=.005418 gram iodoform); an excess of about .3 c.c. is required to produce a good end reaction with chromate of potash, and this should be subtracted. (The method proposed by Greshoff, Proceedings 1889, xxxvii., 619, appears to be less complicated, Rep.)—Am. Jour. Pharm., 1892, 99.

*Iodoform Gauze—Estimation.*—Portes states that it would be better to fix the standard for a given surface instead of for a given weight, since the plain gauzes differ at times considerably in weight. As to the estimation, he deprecates the ether method, and thought that the best method would be to treat a given weight (respectively measure) of the gauze with an alcoholic solution of potassa in a still with reflex condenser. When decomposition is complete the alcohol is distilled (or evaporated) and quantitative estimation made of the alkaline iodide remaining.—Chem. Drug., March 1892, 346.

*Iodoform—In Tuberculosis.*—Flick regards its curative powers as being limited to those cases in which the circulation has not yet been cut off from the deposit. It is dissolved in cod-liver or olive oil, and is given by

inunction.—Am. Journ. Pharm., 1891, 424, from University Med. Mag., Aug. 1891, 727.

*Iodoform—Substitute.*—Under the name, "Improved Antiseptic Powder," the following combination is used with gratifying results, chiefly as a cheap substitute for iodoform:

| | |
|---|---|
| Salol, powdered | 1 Troy oz. |
| Sulphite of zinc, powdered | 1½ Troy ozs. |
| Benzoin, powdered | ½ Troy oz. |
| Talcum, purified | 2 Troy ozs. |
| Oil of fennel | 20 minims. |

Mix.

—Pharm. Record, 1892, xiii., 172.

*Pental—Anæsthetic*—Prof. V. Mehring, who first discovered the anæsthetic properties of amylene hydrate in 1887, has now discovered a new one $C_5H_{10} = {CH_3 \atop CH_3} > C:CH.CH_3$ (amylene) trimethylethylene, which he for brevity's sake proposes to name, in allusion to its containing 5 carbon atoms, "pental." According to the author 20 c.c. are sufficient for a narcosis which is not very deep or lasting, but sufficient for small operations. It has the advantage of leaving no ill after effects. The supplement to the German Pharmacopœia describes it as follows:

A limpid, colorless, mobile, neutral, easily inflammable liquid, burning with a highly luminous flame, and possessing a peculiar, ethereal odor and a sweetish taste. It has a sp. gr. of 0.69, and boils at about 39° C. It imparts no acid reaction to water shaken with it.—Phar. Centralh., 1891, 611.

*Sulphonal—In Consumption.*—Erede finds that sulphonal in doses of ½ to 1 gm. suppresses the night-sweats of consumption, the effect continuing for some days after stopping the medicine.—Am. Jour. Phar., 1891, 556; from Rep. med.

*Sulphonal—Not Without Danger.*—Dr. Bresslauer, Vienna, had given lunatics the drug for a long time in good doses when disturbances set in: great constipation, dark-brown urine, slow, or in some cases rapid but feeble pulse, discolored patches on the limbs and great prostration.—Am. Jour. Phar., Aug. 1891, 424; from Lancet, April 4, 1891.

## PHENOL AND DERIVATIVES.

*Sulphaminol.*—Wojtaszek states that hypodermic injection of sulphaminol (*thioxydiphenyldiamine*) 3 gm. to the kilo of the animal (rabbit) produces no effect, but like foreign bodies became encapsuled after a few days. Exhibited by the mouth it is totally eliminated with the fæces. No antiseptic effects could be observed.—Am. Jour. Phar., 1892, 136; from Przeglad Lekarski, 1891.

*Phenol Derivatives—New.*—A patent has been taken out in Germany

for a process for preparing from volatile oils and other similar substances a series of odorless, tasteless, neutral compounds, which do not attack the mucous membrane. The process consists in subjecting the hydroxyl containing constituents (phenols), or their salts, to the action of an ester or amide of chloroformic acid (Cl.COOH), and thus converting them into what are designated as the corresponding "carbonates (carbonic acid esters) and carbamates (carbamic acid esters)." It is affirmed, that when these compounds are introduced into the organism they will be rapidly absorbed, and split up into carbonic acid or ammonia, as the case may be, and the active hydroxyl compound after the manner of salol, thereby avoiding any toxic action. The process has been extended to the conversion of hydroxyl-containing compounds into alkyl carbonates, as for instance eugenol into methylcarbonate of eugenol. The ethyl and methylcarbonates of guaiacol, creosol, carvacrol, oil of gaultheria and ethyl salicylate, are described.—Phar. Jour. and Trans., Oct. 1891, 266; from Phar. Centralh., 1891, 553.

*Phenol—Action of Potassium Permanganate.*—Led by theoretical considerations, O. Doebner has succeeded in splitting phenol into inactive tartaric acid and oxalic acid by the action of potassium permanganate in the presence of alkali at low temperature.—Chem. Zeitg., Rep., July 1891, 187; from Ber., 1891, xxiv., 1753.

*Phenol—Estimation.*—L. Carré estimates it by comparing the color which the nitro-phenol (formed by the addition of nitric acid) gives to the solution to be examined, with a standard. First he prepares the standard by dissolving 10 gm. of pure phenol in sufficient water to make 1 liter, and from this he makes a series of progressively weaker standard from 5 gm. down to 0.1 gm. per liter. If the liquid to be examined is too concentrated, it must be diluted, say to one-tenth. Put 25 c.c. in a flask and add 5 c.c. of nitric acid; similar portions are taken from the standard solutions with additions of nitric acid, and all the flasks are placed on one and the same water-bath for one or two hours. By comparing the depth of coloration with the standard, a close approximation may readily be made. To obtain further precision 20 c.c. of caustic soda are added and the bulk made up to 50 c.c., and the shade is compared again. The author found 3.52 and 0.9 gm. per liter, the real quantities being 3.50 and 0.10 gm. Alcohol must be driven off, and impure phenols heated long enough to destroy the tarry products present.—Chem. News, 1891, lxiv., 74; from Comptes rend., cxiii., July 1891, 139, 289.

*Carbolic Acid—Synthetical.*—According to H. W. Jayne, only two of the many reactions by which phenol can be produced are at present commercially practical, both using benzol as the starting point. When first placed upon the market, the synthetical acid excited much interest, and purchasers were willing to pay a high price for it.

A good grade of crystal acid can be purchased abroad in large quantities at this time at about eleven cents per pound, while the pure benzol used in the first method is worth at the English refineries about fourteen cents per pound, and aniline oil about twenty cents, without taking into consideration the other expensive chemicals necessary to carry out the reaction.

The first or sulphonate method is applicable to the preparation of all phenols and has been used for some years, producing on an immense scale naphthol, the phenol of naphthalin. In this method pure benzol, free from thiophene, is placed with about five times its weight of strongest commercial sulphuric acid (67° B.) in closed cast-iron pots, provided with stirrers and lead coolers and capable of being heated by a steam jacket. While the mixture is slowly stirred, the vessel is gently heated with steam in such a manner that the vapors of benzol which pass into the cooler are continually returned to the kettle. After a number of hours the reaction is finished, and the benzol not acted on is collected as it flows from the cooler. The crude benzol-sulphonic acid, mixed with the excess of sulphuric acid used, is allowed to cool and then diluted with water in a lead-lined tank. Slaked lime is added to the hot solution in sufficient quantity until it is faintly alkaline. This removes the excess of acid by forming calcium sulphate, which is then filtered off by means of a filter press. The clear liquor containing calcium benzolsulphonate is treated with sufficient sodium carbonate to precipitate all the calcium as carbonate, which is removed by filtration, and the liquor is now evaporated to dryness, leaving the sodium benzolsulphonate as a white powder.

In a large cast-iron kettle, heated by a coal fire, caustic soda is melted, and small portions of the dry sodium salt, prepared as above, are gradually added and finally the whole is kept in quiet fusion for some time. The melt now contains sodium carbolate and sulphite, together with the large excess of caustic soda used—

$$C_6H_5 - SO_3Na + 2NaOH = C_6H_5ONa + Na_2SO_3 + H_2O$$

It is ladled from the kettle into pans and allowed to cool, broken up, dissolved in water and acidified with sulphuric or hydrochloric acid. The phenol thus liberated separates from the concentrated salt solution, and can be collected and distilled.

In melting the sodium benzolsulphonate with caustic soda it is necessary, in order to obtain a good yield, to use a very large excess of the latter. A greater yield is obtained with caustic potash, and if as large a quantity as six parts are used to one of the soda or potash salt, a nearly theoretical yield can be obtained; but as this would greatly increase the cost, caustic soda is used instead.

It has been proposed to treat the melt after dissolving in water with carbonic acid gas, which would liberate the phenol equally well as a stronger

acid, and in addition would form carbonate of soda or potash, which together with the sulphite already present could be converted into the hydrate by treating with lime, concentrated, and used for a second operation. It does not appear, however, that this has been carried out in practice.

The second method is much simpler. A pure aniline oil, preferably that grade called aniline for blue, is dissolved in water in a lead-lined tank covered with a hood and provided with stirrers and leaden steam coils. The solution is acidulated very strongly with sulphuric acid, and to the hot liquid a solution of commercial nitrite of soda is gradually added, phenol being at once formed.

In this reaction the sodium nitrite, in contact with the acid solution, liberates nitrous acid, which forms diazobenzol sulphate with the aniline sulphate—

$$(C_6H_5NH_2)_2H_2SO_4 + 2HNO_2 = (C_6H_5N = N)_2SO_4 + 4H_2O$$

but as the solution is hot it at once decomposes into phenol with evolution of nitrogen—

$$(C_6H_5N = N)_2SO_4 + 2H_2O = 2C_6H_5OH + H_2SO_4 + 4N.$$

Neither of these synthetical methods can, at the present time, compete in price with the extraction of carbolic acid directly from the coal tar oils.

It could scarcely be expected that an acid obtained by either of the complex reactions just described would not be contaminated by products formed by side reactions in the process. In its preparation by the sulphonate method, sulphur compounds (thiophenols, etc.) are likely to be formed; and its manufacture from a substance like aniline, which so readily produces coloring matters could scarcely be carried out without at the same time forming bodies which at once, or later under the influence of light and air, would discolor it.

In addition, commercially pure benzol or aniline oil always contain small quantities of, respectively, toluol or toluidine. These bodies being submitted to the same treatment as their homologues, give cresylic acid. It is true that this acid would be present only in minute quantities, but sufficient to reduce the melting point of the resulting carbolic acid.

Lunge has shown that the addition of 1.3 per cent. of cresylic acid to pure phenol reduces the melting point eight degrees to 32½°, and in the preparation of a high grade carbolic acid a difference of a part of a degree is of great importance.

Forty degrees acid is at present a commercial article sold at excessively low prices, and if a small portion of the attention and labor which is used in producing a synthetical acid was expended in the further purification of this 40° acid, without doubt just as good if not a purer article could be

produced direct from tar oils and at a very much lower cost.—Am. Journ. Pharm., 1891, 569–572.

*Phenols—Volumetric Estimation.*—See page 977.

*Phenerythen—Properties.*—According to Fabini, this red coloring substance of carbolic acid forms, when pure, an amorphous, resinous, odorless and tasteless, dull black powder, having the composition $C_{30}H_{30}NO$ and melting at 98° C.; it is soluble in carbolic acid with beautiful red color, in ether with yellow, in toluol, ethyl-alcohol, amyl-alcohol and acetic acid with brownish-red color; it is difficultly soluble in benzin and carbon disulphite and insoluble in water. Plant and animal-fibres are dyed directly with a brownish-red color. Its formation is explained as follows: If metals act upon carbolic acid containing ammonia, there is formed by reduction a quinone-like body of a dirty-brown color, which later by oxidation is converted into phenerythen. Acting like a weak base it forms a sulphate of indigo-blue color, a nitrate of red color and a hydrochlorate of reddish violet color. Phenerythen in an alcoholic, acetic acid solution is decolorized by treatment with zinc dust forming a leuco-base; red carbolic acid in like manner can be obtained colorless by the action of nascent hydrogen, but exposure to air will cause the red color to speedily reappear.—Am. Jour. Pharm., 1891, 600; from Pharm. Post, 1891, 903.

*Diaphtherine—Oxychinaseptol.*—Emmerich recommends this antiseptic which, according to his statement, is obtained from aseptol (orthophenolsulphonic acid, sozolic acid), by first preparing phenolsulphonate of oxychinolin, from which oxychinaseptol is obtained by the introduction of a second molecule of oxychinolin. The constitution is given as follows:

$$C_6H_4 < \begin{matrix} OHNC_9H_6OH \\ SO_2OHNC_9H_6OH. \end{matrix}$$

It is a bright-yellow (sulphur) colored powder, easily soluble in water. On the addition of weak alkalies and blood, active oxychinolin is separated. On the authority of Dr. Kronacher, a one per cent. solution is sufficiently strong for wounds. As an antiseptic it is stated to surpass phenol, lysol, etc., and not to act as a caustic. Metal instruments will be tarnished (black) by it, and, therefore, discolor the skin.—Phar. Zeitg., 1892, 317.

*Kinocyanine—New Photographic Developer.*—A. Noel has discovered a new developing agent whilst preparing kyanol. Kinocyanine, so called from its similarity to cyanine and quinone, is stated to have the probable formula $C_{25}H_{12}O_{10}$, and is in the form of an amorphous powder of a bluish violet with a gray tinge. It is soluble in water, alcohol and ether, and the solutions are green and violet. It is a powerful reducer of the salts of gold, platinum and silver, and is, therefore, a good developer for gelatinobromide plates.—Chem. and Drug., July 18, 1891, 77; from Annales Photogr.; Drug. Circ., 1891, 202.

*Paramidophenol—A New Developer.*—A. and L. Lumière recommend this chemical as preferable to eikonogen because it never stains the gelatin. The action is stated to be as follows: The water of the developer is decomposed, the paramidophenol appropriating the oxygen and forming quinonimide, and the hydrogen reducing the silver bromide.—Chem. and Drug., July 18, 1891, 76. See also Chem. News, 1892, lxv., 304.

*Phenylurethane (Euphorin)* is strongly recommended by Adler for its analgesic and antirheumatic action.—Am. Jour. Phar., 1891, 424; from Wien. Med. Woch., No. 17.

*Phenols—Volumetric Estimation.*—According to Messinger and Vortmann, a known quantity of the phenol in question is dissolved in such a quantity of soda solution that at least 4 mols. of soda are present for each mol. of the phenol; the soda should be free from nitrite. The solution is then warmed to about 60° C., and decinormal iodine solution added, until a strong yellow coloration is produced. If the solution is now shaken and warmed a precipitate is formed. The solution is cooled, acidified with dilute sulphuric acid, and diluted to 250 or 500 c.c. A measured volume is filtered off, and the excess of iodine titrated with decinormal hyposulphite of sodium. The weight of iodine used to precipitate multiplied with a certain factor, gives the weight of the phenol in question. The factors are: for phenol 0.1235'18; thymol 0.29567772; beta-naphthol 0.37843106; and for salicylic acid 0.18132606.—Yearbook, 1891, 190; from Ber. xxiii., 2753–2756.

*Rodinal.*—This new photographic developer is, according to the analysis of Ehrmann, merely a concentrated solution of paramidophenol.—Pharm. Era, 1892, 115.

## CRESOLS.

*Cresols—Solution.*—The usual solutions, with alkalies or emulsions, are often objectionable when required for medicinal purposes, and several attempts have been made to prepare a neutral aqueous solution. It is now stated that by adding cresol to a very concentrated aqueous solution of sodium salicylate a mixture is obtained which allows of being diluted at pleasure with water without separation of the cresol taking place upon standing. No double compound is formed. The sodium salicylate may be replaced by salts of phenols and naphthols, and solutions made with sodium cresotinate are recommended as the best for surgical and medicinal purposes. A 0.5 per cent. solution is stated to be sufficiently strong for most uses.—Pharm. Journ. Trans., Aug. 1891, 165, from Chem. Zeitg. (Rep.), Aug. 1891, 216.

*Solutol.*—Solutol is the name given to a solution of cresol in sodium cresolate, containing about 60.4 per cent. of cresol, of which three-fourths are in combination with the sodium. It is chiefly intended for crude disinfection, and manufactured in two qualities, one for outdoor use and a

purer one for indoor use; owing to the presence of soda, solutol is hardly adapted for surgical purposes.—Western Drug., 1892, 18, from Zeits. Oesterr. Apoth.-Ver., 1891.

*Solveol.*—This antiseptic differs from "solutol" in being a concentrated neutral solution of cresol in water by means of cresotinate of sodium. According to Dr. Hammer a 0.5 per cent. solution is sufficiently strong for surgical purposes, and probably a 0.1 per cent. will be strong enough for aseptic operations. It is comparatively innocuous, is nearly inodorous, mixes clear with lime water, and the presence of albumen does not reduce its activity.—Zeits. Oesterr. Apoth.-Ver., 1891, 698.

*Ortho-cresol Iodide.*—(Europhen is its isobutyl derivative.)—Ortho-cresol iodide is a light, yellow powder, possessing a strong, rather disagreeable odor. It is easily soluble in fixed oils, and also in alcohol, ether, and chloroform, but insoluble in water. It has a resinous feel, and fingers and instruments can be cleaned only with alcohol. In the animal organism it decomposes very slowly, so that it can be administered for a long time and in quite large doses without danger. It has lately been recommended as a substitute for iodoform.—Zeits. Oesterr. Apoth.-Ver., 1891, 677; from Pharm. Zeitg.

*Europhen—Uses.*—Eichhoff recommends an ointment: Europhen, 5.0; olive oil, 10.0; lanolin, 85.0; and an injection for gonorrhœa: Europhen, 1.0 to 5.0; olive oil and gum arabic, of each 10.0; water, 200.0.—Zeits. Oester. Apoth.-Ver., 1891, 431.

*Europhen*—$C_{22}H_{31}O_2I$—is the name of a compound formed by the action of iodine upon isobutylorthocresol, which itself is a product of the action at a high temperature of isobutyl alcohol on cresol in the presence of chloride of zinc. Europhen is said to contain 27.6 per cent. of iodine, corresponding to one atom of iodine and two molecules of isobutyl-cresol. It is an amorphous yellow powder, resinous to the touch and adhering to the mucous membrane or intact cuticle much more readily than iodoform. It is stated to have a peculiar aromatic odor, recalling that of *o*-cresol and also of saffron. It is insoluble in water and glycerin, but freely soluble in alcohol, ether, chloroform, collodion and fixed oils. Its advantages over iodoform are found in its lightness (covering five times as much surface), comparative freedom from odor, and its non-toxicity. The name "europhen" is unhappily chosen, being too near to "euphorin" (phenyl-urethane). In its various solutions iodine is slowly liberated, especially in the presence of a little water. Owing to this decomposition it should not be prescribed with starch, metallic oxides (zinc, mercury) or mercurial salts.—Pharm. Jour. and Trans., Aug. 1, 1891, 81.—F. Goldmann.—Am. Jour. Pharm., 1891, 459; from Pharm. Zeitg., July 1891, 440.

*Disinfectol.*—This substance is stated to be an energetic disinfectant, similar to lysol and creolin. It is a brownish-black oily liquid, of an

alkaline reaction, and of the specific gravity 1.086, and contains besides hydrocarbons sodium carbolate and resin soaps.—Am. Jour. Pharm. 1892, 135; from Jour. Méd. Chir. Phar., 1891.

*Lysol*—By fractional distillation of coal-tar are obtained: (1) A small fraction (2 to 4 p. c.), containing what passes over at 80° C., ammonia, carbon bisulphide, alcohol, benzol, etc. (2) The light oil forms 6 to 8 p. c. of the tar, and includes the constituents boiling between 80° and 210° C., chiefly benzol and its homologues. (3) The heavy oil, 32 to 40 p. c. of the tar: this is made up of what goes over at between 210° and 400° C., and consists of naphthalin, phenols, high-boiling bases, and several hydrocarbons. The residue in the retort represents pitch, in quantity of 50 to 55 p. c. of the tar. The heavy oil deposits naphthalin on cooling; the separated oil is treated with concentrated soda lye, and the dissolved sodium carbolate is decomposed by sulphuric, sulphurous or carbonic acid. The crude carbolic acid, which rises to the surface, is subjected to fractional distillation; the portions obtained between 185° and 205° C. are known as *cresols*, and constituted as phenol, in which one hydrogen atom is replaced by a methyl group. Although surpassing in germicidal value an equally strong solution of phenol, the cresols were neglected, because of their insolubility in water. They were emulsified by combining them with resin soap, forming what is known as *creolin*, and rendered good service as disinfectants. On dissolving in fat, and subsequently saponifying with the addition of alcohol, the fraction of tar oil, which boils at between 190° and 200° C., a brown, oily-looking clear liquid is obtained, which contains 50 p. c. of cresols, and is miscible with water to a clear, frothing, saponaceous liquid, and is also soluble in alcohol, petroleum, chloroform, glycerin, and carbon bisulphide. This substance is *lysol*. It is considered five times stronger than phenol and eight times less poisonous.—Western Drug., 1891, 450, from New Remedies.

*Lysol—Properties.*—Lysol (see Proceedings 1891, xxxix., 356) is stated by G. A. Raupenstrauch to possess the following properties: It is an oily looking brown liquid, with a not disagreeable, creasote-like odor, mixing clear with water, but foaming easily on agitating; it is also soluble in alcohol, petroleum-ether, benzol, chloroform, bisulphide of carbon, and glycerin. A solution of 1 gm. of lysol in 10 c.c. of alcohol must not acquire a reddish color on addition of a few drops of phenolphthalein solution. It contains 50 per cent. of those cresols which boil between 188 and 210° C.

On distilling 100 c.c. of lysol from a 300 c.c. flask, provided with a thermometer (increasing the heat gradually), the aqueous part of the distillate should not measure more than 15 c.c., and the oil, distilling at a heat up to 210° C., should not measure less than 45 c.c. A drop of this oil, warmed with 1 c.c. of chloroform, and a small piece of potassa, gives an intensely red color. If to a mixture of 10 c.c. of this oil with 100 c.c.

of soda solution (8 per cent.) is added 10 c.c. of petroleum ether, the volume of the latter should not increase by more than 0.5 c.c.—Pharm. Rundschau, N. Y., 1891, 171.

*Sapocarbol.*—Sapocarbol is the trade-name given several years ago to what is now known as creoline and lysol; there may possibly exist some slight differences, but in the main they are saponified cresols and phenols. —Pharm. Rundschau, N. Y., 1891, 246, from Schimmel & Co.

*Saprol—Disinfectant.*—Saprol is a mixture akin to lysol, solveol, and other disinfectants. It consists chiefly of crude cresols, containing quite a considerable proportion of pyridine bases and hydrocarbons, which latter appear to be a by-product from petroleum refineries. Sufficient water has been mixed with it to enable the mixture to float on top of water. It is excellent for out-houses, etc., but, being inflammable, must be used with care.—Pharm. Centralh., 1892, 305.

*Creasote.* See also under *Aqua; Olea;* and under *Pilulæ.*

*Creasote—Pure.*—M. Choay recommends the following method for removing the last traces of phenol. To the distillate with a boiling point of 200° to 210° C. are added first glycerin and then water, whereby all the phenol will be dissolved. After thoroughly washing the creasote, it is dried and distilled in vacuo. The distillate is stated to possess an agreeable odor of guaiacol, and its administration to be free from disagreeable after-effects.—Zeits. Oester. Apoth.-Ver., 1891, 409; from Rep. de Phar., 1891, 259.

*Creasote—Tests for Purity.*—E. Merklen gives the following easily applied tests: Water.—Ten c.c. of creasote are heated with about 2 gm. of calcium chloride in a test tube until the salt melts. The two are then well mixed and put aside to cool. In case water is present the calcium chloride remains liquid. Anhydrous copper might also be used. Phenol.—Of all the tests proposed, Merklen prefers that of Flueckiger. Four c.c. of creasote and 1 c.c. of ammonia are heated to 60° C. (150° F.), well mixed, and poured into a large capsule, which is then tilted from side to side so as to make the liquid cover a large surface. A small vial of bromine is then opened, and the vapor blown over the creasote mixture; pure creasote turns brown and then green, while phenol turns blue. Guaiacol.—This is present in large quantities in true creasote, and if only traces of it are found, adulteration may be suspected. In mixing 5 c.c. of creasote with 50 c.c. of a 20 per cent. solution of potassa in alcohol, the liquid assumes in from ten to thirty minutes a crystalline state due to a compound of creasol and guaiacol with potassium.

The crystalline mass is pressed between filter paper until perfectly dry, and put into a test tube with 5 c.c. sulphuric acid diluted to 1–10. The mixture is heated for a moment when the creasol and guaiacol rise to the top of the liquid. The aqueous liquid is then sufficiently diluted to allow

the oils to sink to the bottom when it is decanted, and is replaced by 4 c.c. of concentrated ammonia. This forms a hard crystalline compound with guaiacol while the creasol after some time forms a semi-solid crystalline mass. On treating the mass with benzin, everything goes into solution but the ammonia compound of guaiacol.

Creasote should have a specific gravity of 1.080, should remain limpid with dilute sodium hydrate, and should not redden blue litmus paper.—Am. Jour. Phar., 1892, 196; from l'Union Phar., 1892, 5.

*Creasote—In Tuberculosis.*—Dr. Julius Sommerbrodt states, after an experience extending over twelve years, that creasote in large doses (1 to 4 grains per day) is unsurpassed as a curative agent in tuberculosis of the lung. He prefers to give it with cod-liver oil in gelatin capsules, containing one grain each. He states further that great numbers have taken from 5,000 to 20,000 capsules continuously without a bad symptom, and with excellent appetite.—Am. Jour. Phar., 1892, 112; from Berlin klin. Woch., 1891.

*Guaiacol—Test of Identity.*—J. Bongartz states that the addition of concentrated sulphuric acid and a minute quantity of acetone to guaiacol or its compounds (benzosol, &c.,) produces a beautiful cherry-red to purplish-red coloration, which is rendered more pronounced on the addition of two volumes of chloroform and shaking. Pio Marfori stated that the behavior to concentrated sulphuric acid, which produces a cherry-red color with pure guaiacol, would be a characteristic test for purity, whilst in the presence of only traces of creasote (cresol, etc.,) the color would be a dirty grayish-green (see also Proceedings 1890, xxxviii., 624). J. Bongartz has subjected this test to trial, and found that perfectly pure guaiacol (fractionated by himself) produced a yellow color, and that the merest trace of creasote sufficed to change the color to cherry-red.—Am. Jour. Phar., Aug. 1891, 408; from Phar. Ztg., 1891, 370.

*Carbonate of Guaiacol.*—This new chemical is a fine, microcrystalline powder, insoluble in water, somewhat soluble in cold alcohol, easily in hot alcohol, ether, chloroform and benzol, scarcely in glycerin and in fixed oils. It melts at 85° C. It is easily saponified by alkalies with separation of free guaiacol. In the animal organism it behaves like salol, not being decomposed in the stomach but only in the intestines, splitting very slowly into carbonic acid and guaiacol, enabling the latter to be absorbed completely. It is prepared by slowly passing one molecule of $COCl_2$ into two molecules of guaiacol, previously dissolved in water containing an equivalent quantity of soda. The carbonate is washed with soda and water and crystallized from alcohol.

$$2C_6H_4\begin{matrix}OCH_3\\ONa\end{matrix} + COCl_2 = \left(C_6H_4\begin{matrix}OCH_3\\O\end{matrix}\right)_2 CO + 2NaCl$$

—Zeits. Oesterr. Apoth.-Ver., 1891, 725.

*Guaiacol Biniodide—A New Aristol.*—Dr. Vicario proposes this chemical as a probable pulmonary antiseptic. It is prepared from guaiacol sodium by the action of iodine in potassium iodide solution. Guaiacol is first treated with an excess of soda, which produces a whitish mass, gradually becoming greenish and violet. The guaiacol sodium can be obtained pure and crystalline by recrystallization from guaiacol. It is then dissolved in water, and to this is added a solution of iodine in potassium iodide as long as precipitation takes place. The precipitate is of a reddish-brown color, possessing the odor of iodine, readily decomposed by heat, melts on the water-bath, and is soluble in alcohol and fixed oils.—Am. Jour. Pharm., 1892, 195; from Progrès Thréap.

*Resorcin in Whooping-cough.*—J. W. Farlow uses resorcin spray in whooping-cough; a 2-per cent. solution into the nose, pharynx and larynx. It is odorless, tasteless and gives speedy relief.—Yearbook Pharm., 1891, 276; from Med. & Surg. Jour.

*Resorcin—Internal Use.*—C. Menche, after nine months' trial, recommends it in cholera infantum and in cholera nostras of adults in a one per cent. solution. He also recommends it in dyspepsia and other gastric affections, and he thinks that he is justified in recommending a trial in sea-sickness and as a hypnotic. He insists, as also Andeer (see Proceedings 1885, xxxiii., 277, and 1890, xxxviii., 632), on the use of "pure" resorcin.—Chem. Zeitg. (Rep.), 1891, 252; from Centralbl. klin. Med.

*Resorcin—Uses.*—Ten-grain doses are generally sufficient to counteract the effects of a spree.—Am. Drug., Aug. 1891, 260.

*Resorcin—Use.*—Andeer recommends resorcin in all cases of blood-poisoning, and bites from poisonous animals.—Zeits. Oester. Apoth.-Ver., 1891, 432; from Mon.-Heft. Dermat.

### THYMOL.

*Thymacetine.*—This is the name given to a derivative of thymol, which stands in the same relation to thymol as phenacetin to phenol. Its constitution is as follows:

$$C_6H_2\ CH_3\ C_3H_7\ \overset{OC_2H_5}{NH}(C_2H_3O).$$

It forms a crystalline, white powder, difficultly soluble in water. In its physiological action it resembles somewhat phenacetin, but its usefulness can not be decided at present for want of sufficient trial.—Zeits. Oesterr. Apoth.-Ver., 1892, 7.

*Thymol-Acetate of Mercury—Uses.*—Loewenthal gives it in syphilis, injecting a solution of 1 gm. with 10 cgm. of hydrochlorate of cocaine in 10 gm. of glycerin. Tranjen uses it in the same way for tuberculosis, 75 cgm. in 10 gm. of liquid vaselin. The injection is made every 8 or 10 days. After two or three injections he gives iodide of potassium.—Am. Journ.

Pharm., Aug. 1891, 403, from Deut. Med. Woch. and Rép. de Ph., June 1891.

*Aristol—(Di-Thymol-di-Iodide).*—L. Borde prepares it by first making a solution as follows:

A. Thymol, caustic soda, potassium iodide, of each 5 gm., dissolve in distilled water 50 c.c. A slight warming will render it limpid.

This solution is poured into solution B., which consists of 250 c.c. of concentrated Labarraque's liquor (chlorinated soda), shaking vigorously. The thymol and iodine combination precipitates in about fifteen minutes. The precipitate is transferred to a filter, washed with distilled water, and dried. It should be prepared in a dark room.—Bull. Pharm., 1891, 260, from Rep. Pharm., 1890, 355. (Beringer's formula is different, see Proceedings, 1891, xxxix., 572.)

*Aristol—A Correction.*—Felix Goldmann takes L. Reuter to task for asserting that aristol contains an alkali iodide, based on the behavior of the residue of the aqueous extract with fuming nitric acid. Goldmann shows that Reuter has misinterpreted the reaction, and that water extracts an organic iodine compound, but not an alkali iodide. These organic iodine compounds are always formed when aristol comes in contact with water, and may be continuously produced by digestion with water. Their formation is due to a secondary process, and the liberation of iodine may be demonstrated by triturating dampened aristol with solution of starch and allowing to stand for several hours. This may be repeated any number of times with the same result. As to Reuter's proposal to purify aristol by treating it for a short time with glacial acetic acid, Goldmann points out that the resulting product would not be aristol, but an entirely different body, which would certainly be inert. He, further, points out that aristol is a derivative not of thymol itself, but of di-thymol.—Am. Drug., Aug. 1891, 241.

*Aristol—Precaution.*—Goldmann calls attention to the necessity of filtering an oily solution of aristol, because solutions in oil have a tendency to gelatinize, and consequently are rendered unsuited for injections. The residue on the filter is caused by an organic iodine compound insoluble in oil, which, although soluble in water, always is formed again on drying, and therefore appears to be a normal accompaniment of aristol.—Zeits. Oesterr. Apoth.-Ver., July 1891, 34.

*Aristol—Uses.*—Dr. J. J. Levick states that it has given almost magical relief in a case of rhus poisoning by freely dusting the powder on the affected part.—Am. Journ. Pharm., Aug. 1891, 424, from Med. News, July 25, 1891.

## GLYCERIN.

*Glycerin—Estimation of Purity in Commercial.*—C. and Ch. Deiss base their process on the fact that a given mixture of glycerin and phenol

always absorbs the same quantity of water, and the weight of water absorbed is proportional to the degree of concentration of the glycerin employed. We place in a beaker, holding about 100 c.c., a mixture of 10 gm. of the glycerin in question and 6 gm. of pure crystalline phenol. Then we drop from a Mohr's burette a solution of 50 gm. of phenol, and 1 liter of water, until there appears, on stirring, a permanent turbidity. Pure anhydrous glycerin requires 28.15 c.c. The authors notice that for every additional per cent. of water the number of c.c. employed diminishes by 0.39 c.c. So that if we call 9 the number of c.c. used, the per cent. of water is shown by the formula $\frac{28.15-9}{0.39}$. It is preferable to work at 11° C.—Chem. News, 1891, lxiv., 202. from Monit. Scient.

*Glycerin—The Ammoniacal Silver Test.*—H. Will has critically examined the ammoniacal silver test of Ph. Germ. (the addition of 3 drops of silver nitrate solution to a mixture of 1 c.c. of glycerin boiled with 1 c.c. of ammonia, should not cause any coloration or precipitate). He finds that by heating the mixture in boiling water or in an air-bath until bubbles of ammonia gas appear, and by removing the test-tube from the bath immediately after the addition of the silver nitrate, the test answers very well. B. Jaffe arrives at pretty much the same conclusions. He shows that the reaction varies according to the amount of ammonia used. With a large excess of ammonia all samples of glycerin will fail to show any reduction, while if an excess of glycerin be used, all samples will reduce ammoniacal silver nitrate. If the boiling point of the mixture be kept sufficiently low (due to the presence of a sufficient quantity of ammonia) no reduction will take place; on the other hand, if by boiling, a portion of the ammonia be volatilized, the boiling point of the mixture will be raised, and then reduction takes place.—Yearbook Pharm., 1891, 138, from Ap.-Zeitg., 1890, 612; Chem.-Zeitg., 1890, 1493.

*Glycerin—Conversion into Sugar.*—Berthelot found that when glycerin is left in contact with albumen, it is converted into sugar, and suggested that, in virtue of this reaction, sugar might be formed from the animal fat. V. Grandis has examined the change produced by the reaction in the albumen. On boiling purified egg albumen with an equal volume of pure glycerin for one half to one hour, filtering, and extracting the filtrate with at least 10 volumes of alcohol (90 p. c.), containing a little ether; a milky liquid is obtained, which in a couple of days leaves a white flocculent deposit. The solution of this deposit in boiling water in its reactions strongly resembles hemi-albumose, but it does not appear to have the same percentage solution, approximating in this respect antipeptone, and is probably identical with Hoenig's compound. Assuming that the proteid is hemialbumose, it is probable that as a first step to its conversion into sugar the glycerin is dehydrated and converted into acraldehyde. The proteid

appears to be formed by direct action of glycerin on albumen, since it may be obtained by leaving the two substances in prolonged contact at the ordinary temperature.—Yearbook, 1891, 110, from Acad. Lincei, vi., 138–145.

*Glycerin—Action upon Borax.*—The action of glycerin upon borax can be followed by noticing the reaction towards litmus paper. Borax solutions are alkaline, but the addition of glycerin will develop an acid reaction; on heating, the alkaline reaction is restored, becoming acid again, however, on cooling; diluting with water will also change the acid reaction into an alkaline one. Glycerin, by the way, is not the only chemical to bring about this change; all poly-atomic alcohols or aldehydes containing as many (OH) groups as carbon atoms will bring about the same reaction. Thus, mannite, glucose, lævulose, glycol, will produce the same change, while saccharose will not effect it.—Am. Journ. Pharm., 1892, 330.

*Glycerin—For Burns.*—It is stated that a few drops rubbed gently on the burn removes the pain almost immediately. In serious cases, the application should be made several times.—Chem. and Drug., July 25, 1891, 104.

*Glycerin as a Dressing.*—J. J. Fiodoroff prefers glycerin to iodoform because it produces no disagreeable secondary effects; in suppurating wounds it diminishes the suppuration, cleanses the granulations, prevents morbid processes and accelerates the formation of cicatrices: it acts like a protective layer; the walls of purulent cavities are rapidly altered, healthy granulations making their appearance.—Am. Journ. Pharm., 1892, 29, from Rev. Thérap.

*Glycerin—As Cosmetic.*—F. Hoffmann points out that for cosmetic purposes glycerin, as usually found, is too concentrated, which causes it to smart on application. It should be diluted with about 15 to 25 p. c. of rose water.—Pharm. Rundschau, N. Y., 1891, 294.

## FIXED OILS.

*Fats—Indices of Refraction.*—Marpmann has examined butter, suet, volatile oils and fixed oils with Abbe's refractometer, and communicates his results in the following tables:

I. *Butter.*—Pure and mixed with different proportions of margarin, lard, and suet.

($^{n}D$ and specific gravity at 100° C.)

| *Butter.* | *Margarin.* | *Specific Gravity.* | *Index of Refraction.* |
|---|---|---|---|
| 100 | 0 | 0.868 | 1.4600 |
| 0 | 100 | 0.861 | 1.4660 |
| 50 | 50 | 0.863 | 1.4630 |
| 75 | 25 | 0.862 | 1.4625 |
| 10 | 90 | 0.860 | 1.4655 |

| | | | |
|---|---|---|---|
| | Lard | | |
| 70 | 30 | 0.865 | 1.463 |
| | Beef suet | | |
| 70 | 30 | 0.864 | 1.466 |
| 80 | 20 | 0.865 | 1.465 |
| 90 | 10 | 0.866 | 1.4635 |

*Beef Suet.* *Indices of Refraction* and *Melting Points.*

| | | |
|---|---|---|
| From the Intestines | 1.470 | 56.0 C. |
| Lungs | 1.467 | 49.3 |
| Omentum | 1.467 | 49.6 |
| Heart | 1.466 | 49.5 |
| Kidneys | 1.466 | 48.0 |

*Balsams, Fixed and Volatile Oils.—Indices of Refraction* $^{n}$D at 15° C.

| | |
|---|---|
| Balsam fir (Canada) | 1.5220 |
| " Peru | 1.5930 |
| Oil of almonds, bitter, without CyH | 1.5463 |
| " " " with CyH | 1.5420 |
| " " sweet, pure | 1.4735 |
| " " " commercial | 1.4810 |
| " anise, commercial | 1.5450 |
| " anise, star, commercial | 1.5430 |
| " (anethol, pure) | 1.5560 |
| " beech nut | 1.5000 |
| " bergamot, commercial | 1.4640 |
| " butter | 1.4630 |
| " calamus, pure | 1.5075 |
| " camphor, light | 1.4750 |
| " caraway, pure | 1.4638 |
| " cascarilla, pure | 1.4865 |
| " cassia, pure | 1.6000 |
| " " Japanese | 1.5815 |
| " castor | 1.4900 |
| " cedar, commercial | 1.5300 |
| " " from lead pencil chips | 1.5650 |
| " copaiva, pure | 1.5045 |
| " chamomile, pure | 1.5110 |
| " " commercial | 1.4710 |
| " " "citrate" | 1.4676 |
| " cod-liver, ordinary | 1.4750 |
| " " best | 1.4800 |
| " cottonseed | 1.4730 |
| " " Russian | 1.4740 |
| " fennel, commercial | 1.5325 |
| " " crude, pure | 11.5333 |
| " " without anethol | 1.5112 |
| " (anethol) | 1.5560 |
| " juniper berries, pure | 1.4793 |
| " geranium Turkish (palma rosa) | 1.4753 |
| " linseed | 1.4780 |

| | |
|---|---|
| Oil of myrrh | 1.5255 |
| " olive, pure | 1.4710, 1.4670, 1.4690 |
| " paraffin | 1.4740 |
| " parsley | 1.4975 |
| " petroleum | 1.4750 |
| " " (fraction at 140–160° C., 190–200, 240–260, 290–310 C.) | |
| " " Baku | 1.4360, 1.4520, 1.4670, 1.4750 |
| " " Oelheim | 1.4350, 1.4500, 1.4680, 1.4800 |
| " " Pechelbronn | 1.4210, 1.4440, 1.4450, 1.4620 |
| " " Tegernsee | 1.4270, 1.4370, 1.4510, 1.4650 |
| " " Pennsylvania | 1.4220, 1.4390, 1.4540, 1.4630 |
| " poppy | 1.4670 |
| " rape | 1.4720, 1.4750 |
| " " refined | 1.4750 |
| " rose, Bulgarian, pure | 1.4423 |
| " " commercial | 1.4675 |
| " santal, West Indies | 1.5080 |
| " " East Indies | 1.5076, 1.5100 |
| " " with 50 p. c. oil of cedar | 1.5075 |
| " savin, pure | 1.4775 |
| " sperm | 1.4830 |
| " thyme | 1.4755 |
| " turpentine | 1.4760 |
| " walnut | 1.4910 |
| " water-fennel (phellandrium), pure | 1.4900 |
| " wormseed, Levant, pure | 1.4720 |
| " wormwood, pure | 1.4935 |
| Xylol | 1.4840 |

—Pharm. Centralh., 1892, 210.

*Fats and Oils—Optical Examination.*—F. Jean recommends the use of the refractometer; vegetable oils deviating the light more or less to the right and animal fats to the left. It will be necessary to use always the same temperature: 22° C. for fluid fats and 45° C. for solid fats; if wax or paraffin are to be examined, the temperature should be that of escaping steam. The author gives the following table:

| 22° C. | | 45° C. | |
|---|---|---|---|
| Flaxseed oil | +54 | Lard | —12.5 |
| Castor oil | +43.5 | Margarine | —15 |
| Cod liver oil | +38 | Beef-suet | —16 |
| Olive-pit oil | +29 | Mutton-suet | —20 |
| Cottonseed oil | +20 | Butter-fat | —35 |
| Colza oil | +18 | Cocoa-nut oil (at 48° C.) | —52 |
| Sesame oil | +17–18 | | |
| Almond oil | +6 | | |
| Arachis oil | +3.5 | | |
| Olive oil | +0 –+2 | | |

—Zeits. Oesterr. Apoth.-Ver., July, 1891, 385.

*Fatty Acids—Results of "Limited Oxidation."*—J. A. Wanklyn and W. Johnstone have applied the "limited oxidation" (first used by W. in 1866) to the high members of the fatty-acid series. Operating on stearic (or margaric) acid, they cut off hydrogen without breaking down the acid, and obtained a new acid which differs in formula from the substance from which it is derived, by containing a smaller percentage of hydrogen. A similar result was obtained from palmitic acid. Further particulars will be given later on.—Chem. Drug., Nov. 1891, 817.

*Animal Fats—Bleaching.*—A. Jolles and F. Wallenstein recommend the following method for bleaching animal fat, claiming that neither the physical nor chemical properties are changed by it. 10 grams powdered potassium permanganate are dissolved in one-half liter of water and mixed with 10 grams concentrated sulphuric acid, also diluted to half a liter; 40 kilos of fat are melted and agitated for five minutes with the above solution; by moderate heat the fat is kept liquefied so as to facilitate separation from the brown magma of hydrated manganese dioxide. Should the fat have a yellowish or brownish color (due to a little dissolved oxide of manganese) the addition of a few drops of sulphurous acid will cause decolorization owing to the reduction of the hydrated manganese dioxide and formation of manganous sulphate.—Am. Journ. Pharm., 1891, 536, from Ztschr. f. Nahrgsm. Unters., 1891, 162.

*Fats and Oils—Decolorization.*—H. Stern has patented the use of chemically pure silicic acid, obtained by precipitation from soluble silicates.—Chem. Zeitg., 1891, 1603.

*Fats and Fixed Oils—Examination.*—J. Moellinger points out the importance of using only pure *commercial* samples for color test comparison, and not strictly pure samples made on a small scale in the laboratory; because especially the empyreumatic products, which inevitably the purest commercial fat or oil will contain, variously modify the color reactions.—Chem. Zeitg., 1892, 726.

*Fats—Estimation.*—In estimating the fat in cacao, P. Soltsien made use of a novel method which probably may have its advantages in other fat estimations. He takes two flasks each with a 100 c.c. mark; in one he introduces about 3 gm. of the dried and powdered substance, and then fills up to the 100 c.c. mark with petroleum ether; in the other flask he fills exactly up to the mark with petroleum ether, and then adds the same quantity of the powdered and dried substance. Both flasks are well-corked, and allowed to stand for several hours with frequent shaking; after depositing, 25 or 50 c.c. from each flask are mixed together, evaporated, dried, and weighed; the result is of course multiplied by 2 or 4. The advantages of this method are that the errors incident to using a weighed quantity of solid in a measured quantity of liquid are avoided.—Apoth.-Zeitg., 1891, 520.

*Fats—Iodine Number.*—Huebl's iodine number being so often mentioned, and no explanation of it having yet appeared in the Proceedings, the following account, taken from Prescott's "Organic Analysis," will probably be welcome to the readers. Huebl's iodine number is a figure corresponding with the quantity of iodine capable of combining with the fatty acids, either free or combined with glyceryl, as contained in the several fixed oils. The necessary reagents are:

1. *Iodine Solution.*—Of iodine, 25 gm. are dissolved in 500 c.c. of alcohol (free from fusel oil); of mercuric chloride, 30 gm. are dissolved in 500 c.c. of the alcohol, and this solution filtered if necessary; when the two solutions are united, and, after 6 to 12 hours' standing, titrated with the standardized thiosulphate solution, and the standard noted. [This iodine solution has been found to be liable to much variation, if used immediately after being made. It is absolutely necessary to allow it to stand, as above directed, before titrating it.—Ed. Am. Drugg.]

2. *Thiosulphate (Hyposulphite) Solution.*—A solution of about 24 gm. of sodium thiosulphate in the liter is made, and its iodine value accurately determined with a weighed quantity of freshly sublimed iodine. About 0.2 gm. of resublimed iodine is placed in a small glass tube closed at one end and provided with a similar tube enough larger to serve as a cover, both tubes being previously dried and weighed. The iodine is heated in the inner tube, on a sand-bath, until it melts, then covered with the outer tube, cooled in a desiccator, and weighed; the cover is now removed, and both tubes are placed in a stoppered flask containing 1 gm. of potassium iodide (neutral and free from iodine), dissolved in 10 c.c. of water. When the iodine has dissolved, the solution of thiosulphate of sodium is added to a burette until the iodine color is reduced to a faint yellow, a little starch solution is added, and the titration completed to the extinction of the blue color. The iodine value of the thiosulphate solution is now written.

3. *Chloroform.*—The purity of chloroform is assured for this assay by digesting 10 c.c. of it with 10 c.c. of the iodine solution at ordinary temperature for two or three hours, and titrating to the extinction of the iodine with the thiosulphate solution, the stated quantity of which should be consumed.

4. *Potassium Iodide Solution.*—One part of pure iodide of potassium in 10 parts of water. It should be neutral in reaction, and should not contain any free iodine.

For the assay, 0.2 to 0.3 gm. of a drying oil, or 0.3 to 0.4 gm. of a non-drying oil, or 0.8 to 1.0 gm. of a solid fat, is taken in a close stoppered flask of about 200 c.c., and 10 c.c., of the chloroform are added for solution. Of the iodine solution 20 c.c. are added in exact measure, and, if the mixture does not become clear after shaking, a little more chloroform

is added. The quantity of iodine should be sufficient to leave a dark-brown color after one and a half or two hours' standing, the time to be taken for the reaction. In titrating the remaining excess of the iodine, 10 to 15 c.c. of the potassium iodide solution, and, after shaking, 150 c.c. of water are added, when the thiosulphate solution is added, with shaking, until the color of both the aqueous layer and the chloroform layer is reduced to a pale yellow, when starch solution is introduced, and the extinction of the iodine completed. For close results the iodine and thiosulphate solutions should be standardized just before or after the assay. The number of parts of iodine taken by 100 parts of the fat is known as its iodine number. Using a sufficient excess of iodine in the reaction, quite constant results are promised.—Am. Drug., 1891, 266.

Charles Rice points out that the proposition to keep the two solutions, which combined make the "Huebl," separate, and only mix them when wanted, is a very questionable improvement, since most analysts agree that old solutions are better than fresh ones. He suggests that this point should be examined more in detail.—Am. Drug., 1891, 377.

*Oils—Huebl's Iodine Addition Method.*—Holde gives the following directions for always obtaining uniform results:

About 0.3 gm. of the non-drying oils (about 0.2 gm. of the drying oils) is weighed in a flask, holding about 300 c.c., and dissolved in 18 to 20 c.c. of chloroform. To non-drying oils is added 50 c.c. of a 15-days old solution of iodine (to drying oils 60 c.c. of an 8-days old solution); and allowed to act for two hours, after which time the unabsorbed iodine is retitrated with sodium hyposulphite, having previously added 40 (respectively 50) c.c. of potassium iodide solution (1 : 10) and about 120 c.c. of water, shaking vigorously. The amount of hyposulphite will give the absorbed iodine. At the beginning of the test 50 c.c. of the iodine solution is titrated with the hyposulphite solution with the addition of starch paste and 40 c.c. of potassium iodide solution (1 : 10), keeping 50 c.c. of the iodine solution in a well-stoppered bottle, which solution is titrated when the test is finished; the mean of the two titrations gives the real titre. If the chloroform solution should happen to get turbid, it must be cleared by the addition of a few c.c. of chloroform. The author found after this method the iodine number of the following oils:

| | | | |
|---|---|---|---|
| Flaxseed | 172–180. | Raw rape | 100–108. |
| Hempseed | 175–176. | Refined rape | 100–107. |
| Poppyseed | 139–143. | Arachis | 91.2–101.5 |
| Sesame | 106–109. | Olive | 79–84(88). |
| Cottonseed | 110–115. | Neatsfoot | 59.1–81.7. |

—Chem. Zeitg., (Rep.), 1891, 228; from Mittheil. techn. Vers.-Anst., 1891, 81. Am. Jour. Pharm. 1891, 484.

W. Fahrion offers a decided improvement on Holde's method, possess-

ing the following advantages: (1) a simple, although not new method, for the standardization of the thiosulphate solution; (2) the excess of iodine solution is exactly stated; (3) the iodine solution is capable of being used even after standing for several months; and (4) that the determination for both drying and non-drying oils is identical.

The necessary reagents are as follows: Mercuric chloride solution, 60 grams in one liter 95 per cent. alcohol; iodine solution, 50 grams in one liter 95 per cent. alcohol; thiosulphate of sodium solution, 24 grams of the crystallized salt in one liter distilled water; potassium iodide solution, 10 per cent.; potassium bichromate solution, 3.874 grams pure, dry salt in one liter water; chloroform; dilute hydrochloric acid.

*To Standardize the Thiosulphate Solution*—10 c.c. potassium iodide solution, 5 c.c. dilute hydrochloric acid, 20 c.c. potassium bichromate solution and 150 c.c. water are placed in a stoppered flask of 300 c.c. capacity and well agitated; to the red solution which contains exactly 0.2 gm. free iodine, is added the thiosulphate solution from a burette until a faint bluish-green color due to the chromium salt results (the addition of starch is not necessary and besides is considered a source of error, as the albuminoids generally present in starch liberate iodine). One c.c. thiosulphate solution corresponds generally to 12–14 gm. iodine; by keeping in well-stoppered bottles very little change in the strength of this solution takes place. *To standardize the iodine solution*—10 c.c. each of the iodine and mercuric chloride solutions are placed in the flask, 20 c.c. potassium iodide solution and 150 c.c. water added; after thorough agitation the thiosulphate is added until the liquid becomes colorless. *The determination of the iodine-absorption* of the oil presupposes that the nature of the oil is known; if unknown, a preliminary determination must be made. 0.2–0.3 gram of the oil to be examined is weighed into the flask, dissolved in 20 c.c. chloroform, a quantity of iodine solution added, which contains *four times as much iodine* as is likely to be absorbed, previously mixed with an equal volume of the mercuric chloride solution; in a second flask are placed the same quantities of chloroform, iodine and mercuric chloride solutions; after standing two hours the proper quantity of potassium iodide solution (for each gram iodine about four grams potassium iodide) and 50–100 c.c. water are added, and the mixture titrated with the thiosulphate solution; the difference between the two represents the iodine absorbed by the oil. In the examination of olive oil which has an iodine-absorption of about 84 for one gram oil, 3.360 gm. iodine should be added; in the case of linseed oil, one gram requires 7.20 grams iodine to be added because 180 is the iodine-absorption figure.—Am. Journ. Pharm., 1892, 79, from Chem. Zeitg., 1891, 1791.

R. Benedikt does not think that Fahrion's plan (to keep the iodine and the mercuric chloride solutions separate, to be mixed when needed) is to be recommended, chiefly because the titre of such mixture is apt to vary

considerably when fresh. He, therefore, recommends to mix them at the latest a few days before being needed. Fahrion's idea, to use four times as much iodine as necessary, Benedikt declares wasteful and liable to lessen the accuracy of the results.—Chem. Zeitg., Rep., 1892, 651.

Fahrion remarks that the great excess of iodine had been proposed originally by Holde and not by him; he has later found that an excess of 100 per cent. will be sufficient, whilst an excess of 30 per cent., as proposed by Benedikt, is not enough. Fahrion proves this with a sample of cod-liver oil which in six titrations with varying excess of iodine gave the following iodine numbers.

| Excess of iodine in per cent. | Iodine number. |
|---|---|
| 186 | 133.8. |
| 133 | 134.1. |
| 102 | 133.6. |
| 62 | 131.8. |
| 41 | 128.9. |
| 21 | 125.5. |

With an excess of 62 per cent. the maximum number has not been attained, which does not remain stationary until after the excess has reached 100 per cent. As to the objection to keeping the solutions separately, Fahrion shows that even after three days the titre of the mixed solutions decreases within five hours by 2.6 mgm. of iodine. A blank experiment must always be made at the same time. Fahrion simplifies his method as follows:

Take of all the fats to be examined invariably, 0.150 gm., dissolve in 10 c.c. of chloroform, add 10 c.c. of the mercuric chloride solution, and then 10 c.c. of the iodine solution, shake, allow to stand for two hours, add 20 c.c. of potassium iodide solution and 150 to 200 c.c. of water, and titrate both the blank solution and the fat solution with hyposulphite solution until colorless. If the real solution does not require at least half as much hyposulphite solution as the blank solution, the assay has to be repeated with double the quantities of the mercuric chloride and iodine solutions.—Chem. Zeitg., 1892, 862.

*Fatty Oils—Elaidin Reaction.*—C. Wellemann found that in testing olive and arachis oils by the elaidin reaction the mass solidifies sooner at a lower than a higher temperature, 13–14 minutes at 14° C., 2 hours 17 minutes at 18–19° C.; also that a longer time is required if the surface of separation of the strata of oil and mercury and acid be not disturbed at the commencement of the testing.—Jour. Chem. Soc., July 1891, 870; from Landw. Vers.-Stat., xxxviii., 447–451.

*Oils, Fixed—Tests.*—Holde states that of all the tests proposed for the identification of fixed oils in admixture, there is only one the reliability of which has not been questioned, namely, the test for sesame oil with hydro-

chloric acid and sugar.—Am. Jour. Pharm., 1892, 139; from Pharm. Zeitg., 1892, 40.

*Fixed Oils—Rancidity.*—G. Marpurgo shows by the following experiment the surprising rapidity with which fixed oils get oxidized by exposure to heat and air. One gm. of recently pressed castor oil required 0.01 c.c. of decinormal soda, but after filtration at 35° C. it required 0.60 c.c.—Pharm. Post, 1892, 86.

*Oils—Emulsifying Power of Bile.*—P. Aspern has found that the emulsifying power of bile depends much on the relative proportion of bile to oil. One c.c. of fresh ox-gall emulsifies 20 c.c. of cod liver or olive oil, which emulsion keeps well at ordinary temperature for 40 hours and more; 2 c.c. of oxgall with the same quantity of oil, will separate in less than 48 hours; 5 c.c. of oxgall with 15 c.c. of oil will keep only a few hours; the addition of 5 c.c. of water makes the emulsion keep a little longer.—Apoth. Zeitg., 1891, 471.

*Fixed Oils—Test for Mineral acids.*—Many fixed oils are easily clarified by a previous treatment with small quantities of a mineral acid, especially sulphuric acid. For technical purposes this treatment is unobjectionable, but it is inadmissible for oils intended for medicinal use, because the acids combine with the glycerides, forming compounds insoluble in water, and which cannot be removed from the oils by the usual washing. G. Marpurgo communicates the following method for the detection of oils subjected to the "acid" treatment.

Dissolve 5 to 20 gm. of the oil in 20 c.c. of ether, add 10 c.c. of alcohol and a few drops of phenolphthalein, and run in sufficient of decinormal soda until the red coloration ceases to disappear. Dissolve a similar quantity of the oil in 50 c.c. of the ether, add 5 gm. of plumbic carbonate, and digest for one hour with frequent agitation at a gentle heat. Filter the ethereal solution from the insoluble portion, and titrate as above with decinormal soda. In the presence of a mineral acid there must be a difference in the number of c.c. of soda solution used, because the lead carbonate will naturally combine with the mineral acid; this difference gives amount of acid, the nature of which can be ascertained by examination of the lead salt. It will be necessary, however, to work with dilute solutions, otherwise the free fatty acids will combine with the lead.—Pharm. Post, 1892, 129.

*Fatty Compounds of High Molecular Weight—Complete chlorination.*—E. Hartmann gives the results of the chlorination of caprylene; diisobutyl, diisoamyl, cetyl iodide, palmitic acid, Pennsylvania petroleum, the commercial refined oil, crude Glician ozokerite, yellow wax, perchloromesole. According to the author the hydrocarbons of the fatty series yield, as the final result of energetic chlorination, perchloromethane and perchlorobenzene, whilst perchlorethane and perchloromesole are obtained as intermediate products.—Journ. Chem. Soc., 1891, 811, from Ber., xxiv., 1011.

*Oil for Lighthouses.*—Quite an interesting resume of the history of the different kinds of oils used in lighthouses by E. Price Edwards will be found in Pharm. Journ. Trans., Feb. 1892, 681.

*Lubricating Oils—Rapid Determination of the Composition.*—Harold Gripper communicates the following method as being more rapid than the ordinary one of separation by ether and weighing (see Allen, Organic Analysis, ii., 83) especially in cases where only approximately correct results are required—within two or three per cent. of the truth. This method is merely an extension of Koettsdorfer's process; 2½ gm. of the sample are saponified in the usual way with 25 c.c. of alcoholic potassa, and after finished saponification the titration is made with seminormal hydrochloric acid, using phenolphthalein as an indicator, and a blank experiment having been made to estimate the strength of the potassa solution, the percentage of potassa used by the sample is calculated. The saponifiable oils chiefly used in lubricating mixtures are brown cottonseed, rapeseed, neatsfoot, lard, tallow and castor oil, the potash-absorptions of which are respectively 22.27, 20.03, 18.70, 19.30, 19.30, 17.90 per cent.; the mean figure is then 20.08 per cent., which may be taken as the potash-absorption of the unknown mixture of saponifiable matter in a lubricating compound. Then 100.0 divided by 20.08 = 4.98 parts of the oil are saponifiable by 1 part of potassa; and the percentage of potassa absorbed by the sample, multiplied by 4.98, gives the amount of saponifiable matter present, and the amount of hydrocarbon oil is ascertained by difference.

In order to estimate the specific gravity of the hydrocarbon oil, the liquid in the oil flask is after the titration raised again to the boiling point, and poured through a filter, which has been saturated with boiling water. The alcoholic solution of soap and potassium chloride will run through and the hydrocarbon oils remain on the filter. After washing once with boiling water, the specific gravity is taken by Hager's method (a globule of the oil dropped into alcohol). The specific gravity of the original mixture being known, that of the saponifiable oils is calculated by difference.

This method takes one hour, at the utmost, and the only source of error is the fact that the nature of the saponifiable oil, and therefore its exact saponification equivalent is unknown. The following actual determinations will show the approximate agreement:

| | By titration. | By the old method of separation and weighing. |
|---|---|---|
| I. | 72.7 p. c. of hydrocarb. oil, sp. gr. 0.900 | 74.4 p. c. and sp. gr. 0.900 |
| | 27.3 p. c. of saponifiable oil, sp. gr. 0.973 | 25.6 p. c. and sp. gr. 0.979 |
| II. | 56.5 p. c. hydrocarb. oil, sp. gr. 0.906 | 58.1 p. c. and sp. gr. 0.908 |
| | 43.5 p. c. saponifiable oil, sp. gr 0.966 | 41.9 p. c. and sp. gr. 0.965 |

—Chem. News, 1892, lxv., 27.

*Fixed Oils, Viscosity*—Compare *Viscosity* in *General Inorganic Chemistry.*

*Nitriles—Formed by Oxidation with Nitric Acid.*—The action of concentrated nitric acid on castor oil, fatty acids, and acetone, by C. Hell and C. Kitrosky.—See Journ. Chem. Soc., July 1891, 812, from Ber., xxiv., 979–987.

*Oils, Drying—Iodine Number,* see above.

*Drying Oils— Oxidation.*—Ad. Livache points out the industrial application of the solid, elastic mass, which is formed by the complete oxidation of drying oils; there being physically a close analogy between this mass and caoutchouc.—Chem. News, 1891, lxiv., 74, from Comptes rend., cxiii., July 1891.

*Butter—Refractive Index.*—Marpmann gives the following indices: With Amagat's oleo-refractometer pure butter shows 29° to 31°; doubtful butter from 25° to 29°.; and adulterated butter below 25°; it will then be easy rapidly to classify butter, and avoid wasting one's time on examining good butter. Abbe's refractometer shows similar differences: The index for pure butter is between 1.4590 and 1.4620; butter, the index of which is higher than 1.4630, is suspicious.—Pharm. Centralh., 1892, 209–211.

*Butter—Composition.*—W. Johnstone states that butter fat contains neither stearin nor normal oleic acid; but that it consists of a mixture of glyceryl "isoleate-palmitate-caprate" and "tri-nondecatoate" in varying proportions. In some butter fats is found glyceryl "dinondecatoate-œnathoate."—Jour. Chem. Soc., July 1891, 849; from Chem. News, lxiii., 56.

*Butter—Analysis.*—After separating the volatile from the non-volatile fatty acids, M. Violette calculates, by means of Duclaux's formula, the ratio of butyric to caproic acid, and the results show that the greater part of the volatile acids consists of butyric and cupric acids:

| | Butter. | Margarin. | Suet. |
|---|---|---|---|
| Butyric acid | 4.62–6.07 | 0.47 | 0.273 |
| Caproic acid | 2.80–3.66 | 0.28 | 0.166 |
| "Concrete" volatile acids | 2.40–3.00 | 1.33 | 0.914 |
| Total volatile acids | 7.22–9.73 | 0.75 | 0.439 |
| Solid fatty acids | 82.28–84.62 | 93.40 | 91.120 |

—Jour. Chem. Soc., July 1891, 869; from Milch-Ztg., xix., 905.

*Butter—Analysis.*—Leffmann and Beam have improved Reichert's distillation process as follows: 5 gm. of the clear butter-fat are saponified with 10 c.c. of "alkali-glycerin;" (1 vol. of a 50 per cent. solution of soda and 5 vols. of C. P. glycerin) and boiled for 15–20 minutes, in order

to get rid of the water. In a short time the saponification is completed, and the liquid gets clear, when the flask is removed from the fire, and the contents are dissolved in 90 c.c. of water. After solution add 50 c.c. of diluted sulphuric acid (25 c.c. concentrated acid in the litre) and a piece of pumice stone, and distil with the usual precautions until 100 c.c. are obtained. The distillate from pure butter requires 0.2–0.3 decinormal alkali for neutralization. This process is based on the fact that butter contains a considerable amount of volatile fatty acids, whilst oleomargarin contains a good deal less.—D.-A. Apoth. Zeitg., July 1891, 60.

*Butter—Tests of Purity.*—G. Fritsch makes use of the solubility of the barium salts of the volatile fatty acids of butter-fat. From 0.99–1.01 gm. of the clarified fat is heated in a strong flask of 150 c.c. capacity with 50 c.c. of decinormal barium hydroxide for 6–8 hours at 140° C. by means of a paraffin-bath. When the saponification is complete, the contents are passed as rapidly as possible through a filter into a half-litre flask, and washed with boiling water until the flask is full. The separation of the soluble from the insoluble barium salts is perfect excepting in the case of cocoanut oil, which contains lauric acid. The insoluble barium salts are decomposed with 25 c.c. seminormal hydrochloric acid, and warmed on the water-bath, filtered, washed, and weighed. In the solution of the soluble barium salts, the excess of barium is determined by means of decinormal hydrochloric acid, as also the total amount of barium as sulphate. He gives a table of results from which we gather that:

| | Ba in insol. salts. | Ba in sol. salts. |
|---|---|---|
| Butter averages | 67.26 | 32.74 |
| Pig-suet (? lard) | 80.82 | 19.18 |
| Tallow | 87.07 | 12.93 |
| Margarine | 75.89 | 24.11 |
| Cocoa-nut oil | 66.98 | 33.02 |
| Palm oil | 73.24 | 26.76 |
| Butter with 30 per cent. suet (?) | 70.86 | 29.14 |
| " " 50 " " | 74.02 | 25.98 |
| " " 70 " " | 78.37 | 21.16 |

—Jour. Chem. Soc., July 1891, 868; from Chem. Centr., i., 1891, 283. Am. Jour. Pharm., 1891, 466.

*Butter—Estimation of Free Acids.*—According to C. Besana, 20 gm. of butter are melted on a water-bath, separated from the buttermilk and filtered; 10 gm. of the still fluid fat are weighed into a cylinder, holding about 40 c.c., and of a diameter of 17 to 18 mm.; after being well-stoppered, the cylinder is dipped into water of 45° to 50° C., and the fat treated with 45 c.c. of 95 p. c. alcohol as follows: Fifteen c.c. of the alcohol are first poured upon the fat, and after warming for several minutes, shaken for

about one minute, and the cylinder kept in the water-bath until the alcohol has separated completely from the fat. This is poured off carefully and the process repeated twice with similar quantities of alcohol. The alcoholic solution is then titrated with decinormal soda with ½ c.c. phenolphthalein solution (0.5 gm. in 1 litre of 50 p. c. alcohol) as indicator. Each c.c. of the soda solution necessary the author calls an "acid number."—Chem. Zeitg., 1891, 410.

*Aldepalmitic Acid.*—Benedikt doubts the correctness of the assertion of Wanklyn, that the chief acid of butter is what he names "aldepalmitic acid" (see Proceedings 1891, xxxix., 578) with the formula $n(C_{16}H_{30}O_2)$, because that would imply that the saponification number of the insoluble fatty acids should be considerably lower than hitherto observed, or the aldepalmitic acid be polybasic, neither of which is probable.—Chem. Zeitg., 1892, 652.

*Butter—Effect of Feed on the Volatile Acids—Melting Point and Specific Gravity.*—N. T. Lupton has instituted a series of experiments and found that feeding on cotton-seed meal increases in a remarkable degree the melting-point of butter, and diminishes to a corresponding extent the volatile acids, while the specific gravity remains virtually the same. The color is not changed. Being so rich in albuminoids, cotton-seed meal must be mixed with ensilage or hay.—Chem. News, 1891, lxiv., 79, from Journ. Am. Chem. Soc., xiii.

*Butter—Rancidity.*—C. Besana has found that the rancidity stands in very little relation to the amount of free acids present, and he instances a very rancid butter which showed only 2.8 "acid number," while a perfectly sweet butter showed 3.5 "acid number."—Chem. Zeitg., 1891, 410.

*Butter—Acids in Rancid.*—P. Corbetta found that in no case could the volatile acids be washed from rancid butter either by water or by sodium bicarbonate.—Year-book Pharm., 1891, 88, from Chem. Zeitg., xiv., 406.

*Butter—Vegetable.*—According to F. Jean an alimentary fat has for some time been manufactured at Mannheim from the oil of cocoanut, the acrid flavor of which is removed by treatment with alcohol and animal charcoal. It is the only fat which is analogous to cow butter, as it contains the same proportion of soluble fats, and it has the advantage of being perfectly free from pathogenic organisms. A hectare (about 2.47 acres of cocoa palms) represents 225 trees, and yields yearly 800 kilos. of oil.—Chem. News, lxiv., 1891, 189, from Monit. Scient.

*"Gilt Edge Butter Compound."*—This secret compound, by means of which one pint of milk and one pound of butter are stated to give two pounds of butter, has been examined by H. W. Wiley, who found it to consist of 70.84 per cent. of anhydrous sodium sulphate and 29.52 per cent. of pepsin. On trial he found that pepsin, pancreatin and trypsin, as well as rennet, enable butter to mix with an equal weight of milk without

sensibly altering its appearance.—Chem. Zeitg., 1892, (Rep.,) 34; from Jour. appl. Chem., 1891, 683.

### LARD.

*Lard vs. Vaselin in Ointments.*—See under *Unguenta.*

*Lard—Tests of Purity.*—Dieterich, in the last issue of the Helfenberger Annalen, remarks that the melting point of pure lard, as given by the last German Pharmacopœia, viz., between 36° and 42° C., can be relied upon as a criterion only when the method by which it is determined is also given, since the same fat will show different melting points according to the method used. Dieterich determines the melting point by enclosing the fat in a glass tube open at both ends, which is immersed (vertically) in water. The temperature at which the fat rises in the tube is taken as melting point.

According to Dieterich the melting point of lard tried out by himself varied between 40° and 43° C.; of lard bought in the market, 38° and 44° C. Hübl's iodine number, in the case of the former, was between 51 and 58.9; in the latter, between 50.7 and 62.9.

The German Pharmacopœia gives no test showing the absence of foreign fats. Dieterich thinks that Hübl's iodine test ("iodine number") is a very valuable criterion. He has also examined the various processes recommended in recent times for the detection of cottonseed oil in lard, but does not find any of them reliable.

Special attention is called to the fact that Becchi's silver test and Labiche's acetate of lead reaction, although valuable when applied to lard adulterated with unheated cotton-seed oil, *fail to give any reaction* if the cotton-seed oil had, previous to its admixture with the lard, been brought to a temperature at which it emitted fumes for one or two minutes. Lard adulterated with oil of this kind does not respond to the test. And it is quite likely that lard manipulators already know this fact and work accordingly.—Am. Drug., July 1891, 202.

*Lard—Testing.*—According to C. Engler and G. Rupp, the most reliable test is Huebl's iodine number, then follow: Becchi's silver nitrate test (see Proceedings 1887, xxxv., 281); Labiche's acetate of lead and alkali test (see Proceedings 1888, xxxvi., 512); and lastly Maumené's sulphuric acid test (see Proceedings 1880, xxviii., 287). The authors found pure lard to yield the following results: Huebl's iodine number, 57.3 to 59; Becchi's silver test, no color; Labiche's acetate of lead test, white mass; Maumené's sulphuric acid test, 31 to 32° C.—Am. Drug., 1891, 266; from Zeits. angew. Ch., 1891, 13.

*Lard—Testing.*—Welmann's test is as follows: On shaking a solution of *pure* lard in chloroform with a solution of sodium phosphomolybdate in nitric acid, the color is not altered. In presence of fixed *vegetable* oils, however, the molybdic solution is reduced and rendered green, the color

increasing in proportion to the percentage of the foreign oil present. On neutralizing the liquid with ammonia, the color changes to blue. No alteration is produced by the ammonia in the colorless liquids resulting with pure lard. To a solution of 1 gm. of the lard in 5 c.c. of chloroform add 2 c.c. of phosphomolybdic acid, or sodium phosphomolybdate with a little nitric acid, and shake vigorously. The only animal fat, or oil, which reduces the test is cod-liver oil. Welmann points out the necessity of the thorough cleanliness of all the utensils, as some of the impurities may reduce the molybdic acid.—Am. Drug., 1891, 266, from Zeits. angew. Ch., 1891, 13.

H. Wimmer confirms the reliability of Welmann's phosphomolybdic acid test for the purity of lard.—Pharm. Zeitg., 1892, 7.

*Lard—Detection of Vegetable Oils.*—P. Welmann publishes another test for fixed oils, which is serviceable in detecting cotton-seed oil in lard. It is to add to the lard a cold saturated solution of picric acid in ether, and allow the solvent to slowly evaporate; pure lard will then show a lemon-yellow color, whereas, admixed with cotton-seed oil, it will have a brown-red color; pure cotton-seed or other fixed oil will become brown. Phospho-tungstic acid will also suffer reduction through the fixed oils, especially cotton-seed oil and cod-liver oil; in this case there is produced a violet coloration which on addition of excess of alkali (ammonia) changes to a beautiful blue, but the colorations with this reagent are not as permanent as with phosphomolybdic acid.—Am. Journ. Pharm., 1892, 84, from Pharm. Zeitg., 1891, 798; 1892, 22.

## TALLOW.

*Tallow—Saponification.*—H. N. Warren boils the fat in a copper pan with a solution of equal parts of sodium and potassium hydroxides for about ten minutes. The fatty acids are liberated with dilute sulphuric acid, washed, dried by blowing air through the molten acids, and the solidifying point taken in the usual manner.—Journ. Chem. Soc., Sept. 1891, 1144, from Chem. News, lxiii., 143.

## LANOLIN.

*Lanolin.*—Wool fat according to Pharm. Record, 1892, xiii., 215, is stated to be obtained to the amount of 12,000 tons in the milling districts of England.

*Lanolin—Examination.*—Edo Claassen has examined lanolin from Jaffé and Darmstaedter and found that it contained the usual percentage of incorporated water; that it could absorb a good deal more water than generally is expected from a good quality of lanolin; and that the non-saponifiable portion is easily soluble in hot alcohol, separating on cooling in granular crystals, which would exclude both vaselin and paraffin. The method of examination was, briefly, to remove the water by prolonged heating on a water-bath = 26.118 per cent. of water. Saponifying with

soda, and separating the unsaponifiable fat by digestion with petroleum-ether = 4.2810 per cent. of saponifiable fat and 4.3296 per cent. of unsaponifiable. A certain quantity of the lanolin was gently heated to soften it, and kneaded with water gradually added, as long as the latter was absorbed—besides the above mentioned 26.118 per cent. of water, the lanolin could absorb 285.032 per cent. more. Claassen examined the lanolin for the presence of petroleum products, according to the method of Vulpius; Lanolin is dissolved in 5 c.c. of chloroform and 5 c.c. of concentrated sulphuric acid carefully poured on top so as to form two layers, when on the line of contact a brownish-red color was observed which deepened after 24 hours. Although no violet tint appeared on the brown layer, the chloroform was colored yellowish-brown all through, and the presence of a petroleum product might therefore appear to be indicated. The other behavior, especially that of the unsaponifiable fat to hot alcohol, however, disproves this supposition.—Pharm. Rundschau, N. Y., 1892, 53.

*Anaspalin.*—This new substance is stated to be extracted from wool-fat, etc., and is probably merely lanolin under a new name.—Pharm. Post, 1892, 118.

*Thilanin.*—This substance is a sulphuretted lanolin, containing 3 per cent. of sulphur, though whether in combination with the cholesterin, or with the fatty acids, has not been determined. It is a brownish-yellow, unctuous substance of the consistence of lanolin, and is stated to be non-irritant.—Pharm. Journ. Trans., Nov. 1891, 426, from Pharm. Centralh., 1891, 678.

*Margaric Acid—Existence Asserted.*—Since the researches of Heintz, nearly fifty years ago, the margaric acid of Chevreul has been considered to be a mixture of about equal proportions of stearic and palmitic acids. J. A. Wanklyn and W. Johnstone have lately proved that margaric acid exists naturally. Some time ago they bought several pounds of commercial stearic acid, which had a melting point of 56° C. According to the received opinion, it ought therefore be a mixture of stearic and palmitic acids in about equal proportions, and its baryta-salt, made by completely saturating it with baryta, was found to be in accordance with that doctrine. On endeavoring to fractionate the acid, they found that they were unable to alter the composition of the salt. First of all, an acid baryta-salt was prepared by boiling an excess of acid with baryta-water. The resulting baryta-salt, after drying, was shown to contain 12.1 per cent. of barium. This acid salt was next subjected to the action of boiling alcohol, which extracted the excess of fatty acid; the residual salt was then found to contain 20.15 per cent. of barium. On repeating the experiment with a fifteen-years' old specimen of stearic acid, the final baryta-salt was found to contain 20.29 per cent. of barium. These results correspond with the composition of margarate of barium, $C_{17}H_{33}BaO_2$, which requires 20.30 per

cent. of barium. On calculation it will be seen that the stearate requires 19.49, and the palmitate 21.17 per cent. That the deductions of the authors are correct is also borne out by the results of experiments on the solubility. In alcohol, sp. gr. 0.830, the acid yielded the saturated solutions (number of gm. in 100 c.c. of the solution). At 15°, 20°, 25° and 30° C.—2.50, 3.75, 7.0 and 13.0 gm. These solubilities are incompatible with the presence of half its weight of palmitic acid, the solubilities of which for the same temperatures are: 3.75, 8.50, 21.0 and 34.0 gm. With gasoline—a mixture of hydrides of amyl and hexyl—the results are equally decisive. At 10°, 15° and 20° C.—2.5, 4.5 and 10.0 gm., while palmitic acid gives, at 5° and 10° C.—8.0 and 15.0 gm.—Chem. Drug., Nov. 1891, 745.

## OLEIN.

*Olein—Analysis.*—A. Koerner separates the unsaponifiable portion of olein by saponifying 3 to 4 gm. with a slight excess of deci- or semi-normal alcoholic potassa, mixing with a considerable quantity of ignited sand, evaporating to dryness, and extracting the residue with 150 c.c. of hot ether, to which some alcohol has been added. To this solution an ethereal solution of mercuric chloride (2.42 parts for 1 part of the potassa) with the addition of alcohol. The mercuric salts of the fatty acids separate; the clear solution is filtered off, the precipitate washed with ether, and the ether distilled from the filtrate until this measures about 30 c.c. Evaporate to dryness, and extract completely with light petroleum (boiling point below 50° C.), and weigh the residue after evaporation.—Jour. Chem. Soc., Sept. 1891, 1144, from Chem. Centralblatt, 1891, i., 218.

*Oleine (Turkey Red Oil)—Determination of Amount of Fatty Matter.*—Rowland Williams.—Chem. News, July 10, 1891, 15.

*Oleic Acid—Conversion into Solid Fatty Acids.*—The methods of conversion founded on the action of chlorine, bromine, iodine (see Proceedings 1889, xxxvii., 642), nitrous acid or of melting potassa, are not economical, and sometimes too delicate for industrial use. Schmidt heats 10 parts of oleic acid to 180° C. with 1 part of zinc chloride. The reaction is complete when a drop of liquid taken from the melted mass and boiled in a test-tube with dilute hydrochloric acid solidifies on cooling. The whole is then dissolved, the dilute hydrochloric acid boiled by passing a jet of steam into the liquid, and the aqueous portion is then removed by decantation; this operation is repeated until all the zinc has been removed. The product is then washed with water and distilled in superheated steam with an ordinary rectifier. Any unconverted oleic acid is removed by pressure or by centrifugal action.—Chem. News, 1891, lxiv., 297, from Monatsh. Chem.

*Oleite—(Sodium Sulphoricinate).*—W. A. H. Naylor gives the following working formula:

To 1 pound of castor oil add gradually, with continuous stirring, 2 av. oz. of sulphuric acid. This part of the process will occupy several hours, and should be timed so as to be finished towards the end of the working day. In the morning introduce in the same manner 1 av. oz. of the acid, or a sufficiency. The final point is reached when the product remains clear, or as is generally the case, is only faintly opalescent when diluted with about forty times its volume of distilled water. The application of a moderate amount of heat is favorable to the reaction. The temperature may be allowed to reach 110° F., and may even rise to 120° F. When the chemical combination is complete, the product is at once intimately mixed with 1½ times its weight of distilled water, and allowed to stand until complete separation has taken place. The supernatant oily layer is then removed and neutralized with a 10 per cent. aqueous solution of soda. This soda compound is then shaken up with five times its volume of proof spirit and set aside, when any free oil will rise to the surface. The lower portion is evaporated on a water-bath to a thick jelly, the liquid being kept faintly alkaline by the addition of soda solution if necessary. The resulting product usually contains a small proportion of sodium sulphate, which, considering the ordinary use to which oleite is put, is of minor importance. If considered necessary to remove the sulphate, the oleite is treated with alcohol in which sodium sulphate is practically insoluble.—Yearbook Pharm., 1892, 267, from Chem. Drug., 1890. (The above method is quite different from that of A. Convert, see Proceedings 1884, xxxvi., 571.—Rep.)

*Palmitic Acid.*—C. Hell and C. Jordanoff find that this acid is most conveniently prepared from Japanese wax, which yields one-half its weight of pure palmitic acid, whilst palm oil yields only one-fifth its weight; the acid is purified by distillation under reduced pressure, and melts at 62° C. The authors describe the following derivatives: *a-bromopalmitic; a-hydroxypalmitic; a amidopalmitic; a-anilidopalmitic* acids; and *palmitanilide.*—Jour. Chem. Soc., July, 1891, 820; from Ber., xxiv., 936–943.

*Stearic Acid—Commercial.*—J. A. Wanklyn and W. Johnstone prove that the stearic acid of commerce is nearly always margaric acid, which see.

*Thiolinic Acid.*—According to a patent application, this "acid" is made by heating 6 parts linseed oil and 1 part flowers of sulphur until a decided frothing takes place (at about 230° C.), allowing to cool and heating this sulphur-oil on a water-bath at 80–100°, with an equal weight of sulphuric acid, sp. gr. 1.840, until evolution of sulphur dioxide ceases and a uniform liquid results; this is poured into a large quantity of water and thoroughly manipulated so as to remove the excess of acid, collected upon a strainer and dried. This constitutes the thiolinic acid, a friable, amorphous mass of dark greenish-brown color, sintering at 65–70° C., and containing about 14.2 per cent. sulphur; it is insoluble in water, but is soluble in alkalies and alkaline carbonates, from which solutions sodium

chlorides precipitates the salts; it is intended as a therapeutic agent.—Am. Jour. Pharm., 1892, 309; from Apotheker Zeitg., 1892, 227.

## CARBOHYDRATES.

*Cellulose—Preparation in Large Quantities.*—Fir-wood (1 part), free from bark, is cut into cubes 10–15 mm. in length, and heated at 45–50° C. with a mixture (10–15 parts) of concentrated sulphuric acid (1 vol.) and a 25 to 30 per cent. nitric acid (3 vols.) for 14–16 hours; the light-yellow product is then separated from the warm solution, washed first with cold then with hot water, and boiled with dilute soda until it is reduced to a pulp. The dark-brown liquid is run off and the pulp washed thoroughly with water (acidified with sulphuric acid if alkaline) until the washings are colorless. The cellulose obtained in this way is quite colorless, has a neutral reaction, and does not give the reactions of lignin; it is very strong and fibrous and contains 1.5–1.8 per cent. of ash, but is free from nitro-cellulose; the yield is 38–41 per cent.

The acid liquid, separated from the cellulose, contains considerable quantities of oxalic acid, small quantities of fatty acids, and substances such as cellulose-sulphuric acid, which reduce Fehling's solution; it is used again four or five times for treating fresh quantities of wood, the only difference being that in each operation the mixture is raised to a temperature about 5° C. higher than that employed in the previous one. The nitric acid is then completely used up, and the clear solution, if left for about 24 hours, deposits a considerable quantity of oxalic acid, which is nearly pure and may be obtained pure by recrystallization from water; the yield is about 29–30 per cent. of the weight of the dry wood employed. After adding the proper quantity of nitric acid to the acid liquor remaining after separation of the oxalic acid (which liquor contains about 30–32 per cent. of sulphuric acid) and a little sulphuric acid if necessary, a mixture is obtained which can be again used for treating a fresh quantity of wood.—J. Lifschuetz.—Jour. Chem. Soc., July 1891, 814, from Ber., xxiv. 1186–1192.

For the complicated chemistry of the action of nitric acid on vegetable fibres, see article by C. F. Cross and E. J. Bevan in Jour. Chem. Soc., 1891, Sept., 1001, from Ber., xxiv., 1772-1776.—Chem. News, 1891, lxiv., 63.

*Mannan.—A Hemi-cellulose Obtained from Ergot.*—See *Ergota*.

*Fibre, estimation*, see under *Starch*.

*Lignin Reaction*—Bertrand points out that on gently heating vegetable tissue with concentrated hydrochloric acid, containing 0.1 per cent. of orcin, the ligneous parts are rapidly stained violet; making this reaction suitable for the microscope.—Chem. Zeitg., xv., 919, from Soc. Chim.

*Vegetable Fibres—Detection in Silk or Wool.*—The following method

of S. Fubino is based upon the conversion of cellulose into sugar, and upon the colorization of the coloring matter of orchil in the presence of sugar and alkali. A small piece of the fabric under examination is made to imbibe several drops of sulphuric acid, 66° B.; after 5 or 10 minutes add 5 c.c. distilled water, heat to boiling, decant the liquid, add gradually concentrated solution of caustic soda until strongly alkaline, add a few drops of a dilute solution of extract of orchil, and heat the violet liquid for several minutes to 90°, when if cotton, flax, or other vegetable fibre was present, it will be decolorized (on exposure to the air the original color will be reproduced). Should the violet color of the liquid remain after five minutes' heating, the fabric is free from vegetable fibre, or, at most, contains but a minute proportion of the same.—Am. Jour. Pharm., 1892, 317, from Il Selmi; Revue Internat. Bibliogr., 1892, 75.

*Lignin—Reactions.*—F. v. Hoehnel calls attention to the fact that several carbohydrates (especially cane sugar and dextrin) give reactions very similar to those of lignin; making it quite possible to suspect the presence of lignin in the purest kind of Swedish filtering paper. He recommends, therefore, to check the lignin reaction by the microscopical examination. —Chem. Zeitg. (Rep.), 1891, 258, from Waarenk. Techn.

*Wood-pulp—Use as Absorbent.*—See *Precipitates*.

*Nitro-jute.*—In the manufacture of pyroxylin, cotton was primarily used; later, explosives were prepared by using wood and cellulose. Dr. O. Mühlhäuser recently experimented with jute and with good results. Taking 5 parts nitric acid and 10 parts sulphuric acid for one part jute, and keeping the temperature 15° C. during the whole operation, there is principally produced cellulose pentanitrate, $C_{12}H_{15}O_5(O.NO_2)_5$. The product is insoluble in water, alcohol, ether, benzol; soluble in acetic ether and nitro-benzol; if only moistened with acetic ether there is produced a gelatinous mass; nitro-jute is partially soluble in ether-alcohol, a mixture of two parts ether and one part alcohol dissolving 11.93 per cent.; the residue is only slightly soluble in acetone. The most important difference between pyroxylin and nitro-jute is found in the action of alkalies and alkaline carbonates, nitro-jute being readily denitrated; to deprive the product of the acid retained after washing, a dilute (one per cent. or less) and cold solution of sodium carbonate gives the best results.—Am. Jour. Pharm., 1892, 144, from Chem.-Zeitg., 1892, 163.

*Gun-cotton (Pyroxylin).*—See under *Collodion*.

*Celluloid—Analysis.*—H. Zaunschirm suggests to dissolve a weighed quantity of celluloid in a mixture of alcohol and ether (or in methyl alcohol), mix it with a weighed quantity of washed and ignited asbestos or pumice-stone, dry, disintegrate the mass, extract the camphor with chloroform, dry, and weigh; then extract with absolute methyl alcohol, evaporate, weigh, and examine the nitro-cellulose in the nitrometer, by stirring

it in a finely divided state, by means of a platinum wire, with sulphuric acid in the funnel of the nitrometer, and proceed as usual.—Jour. Chem. Soc., July 1891, 866, from Chem. Zeitg., xiv., 905.

*Celluloid—Composition and Manufacture.*—According to De la Royne, a thick collodion is first made in which the ether is replaced by camphor, and which, therefore, contains pyroxylin, camphor and alcohol. This collodion is brought to the consistence of a paste, slightly heated, and rolled; the heat is gradually increased to remove the volatile solvent, and a horny transparent substance is left. Boekmann gives the following composition of that made in Berlin:

| | In sticks. | In plates. |
|---|---|---|
| Pyroxylin | 64.89 | 73.70 |
| Camphor | 32.86 | 22.79 |
| Ash (and coloring matter) | 2.25 | 3.51 |

The nitro-cellulose itself can be made in various ways; either paper, cotton, or shavings can be employed. The cellulose is placed into glass vessels containing a mixture of one part fuming nitric acid with two parts of sulphuric acid, and the temperature kept at about 22° C. The soaking continues from three to twenty minutes, according to the nature of the material. According to another process, 115 gm. of sulphuric acid of specific gravity 1.84, and 93 gm. of nitric acid of specific gravity 1.40, may be heated together to 80° in a porcelain dish. As much cotton as possible is immersed in this liquid, and after soaking for five minutes washed freely in water. The product thus prepared is completely soluble in alcohol.

The pyroxylin, prepared as above described, is left for twenty-four hours in contact with 15 to 35 parts of camphor and 11 of alcohol of 90 per cent. strength; a gelatinous mass is thus obtained which is solidified by heat, the alcohol being driven off. This mass is usually rolled between metal cylinders heated by steam on the inside, the external surface being kept at 60°, and this rolling is continued, the cylinders being gradually brought closer together, until the sheet is about 12 mm. thick, and of the wished-for strength and consistence.

Crude celluloid is a horn-like, transparent mass, of slightly yellowish color, and of specific gravity 1.25 to 1.45. Heat softens it and renders it capable of taking impressions. At 90° it becomes very plastic, and on further heating it becomes still softer, but when heated for some time at 140° the camphor volatilizes and the pyroxylin is left.

It readily kindles, and burns with a smoky flame like turpentine; it can be extinguished by vigorous blowing, but continues to disengage thick vapors of camphor.

Sulphuric acid rapidly decomposes celluloid on heating, while hydrochloric acid attacks it much less vigorously. Nitric acid slowly attacks

it in the cold, very rapidly on heating, and the same is true of caustic soda. Acetic acid dissolves it, giving a solution from which water precipitates camphor and nitrocellulose. It is also soluble in ether, acetic ether, acetone, fatty oils, alcohol, and turpentine.

M. Franchimont states that when paper is treated with a mixture of sulphuric acid and acetic anhydride, a colored liquid is formed which gives a precipitate with water. The powder thus formed, after washing in a large quantity of water and then with cold alcohol, dissolves in boiling alcohol, and crystallizes out, on cooling, in needles or plates. This substance is almost insoluble in ether, dissolves in benzin, and melts at 212° C. It corresponds to the formula $C_{40}H_{54}O_{27}$, and is looked upon by M. Franchimont as a triglucoside containing eleven acetyl groups.—Am. Drug., 1891, 299, from Revue de Chim.

*Levosin—Carbohydrate of Some Cereals.*—C. Tanret discovered this carbohydrate some time ago, and prepares it by exhausting ground rye with 50 per cent. alcohol, precipitating the gum with strong alcohol, distilling off the alcohol from the supernatant liquid, and adding to the residue baryta solution as long as the precipitate is redissolved on shaking. After filtering, the liquid is completely precipitated by baryta solution, the precipitate is collected on a strainer and decomposed by carbonic acid. The barium carbonate is removed by filtration and the filtrate evaporated; the levosin is purified by dissolving 50 per cent. alcohol, and the absolutely necessary quantity of dilute sulphuric acid added to remove the remaining baryta. From the filtrate strong alcohol throws down the levosin.

Anhydrous levosin is a white amorphous body almost tasteless; very soluble in water, freely in weak alcohol, but scarcely in strong alcohol. It does not reduce Fehling's solution, nor does it ferment with beer-yeast; diastase has no action upon it. The formula is $C_{48}H_{10}O_{10}$.—Chem. News, 1891, lxiv., 61, from Bull. Soc. Chim., No. v.

*Starches, Fermentation, Action of Mineral Acids.*—J. Effront states that whilst in ordinary fermentations the yield of alcohol was only 43 per kilo of starch, by the use of fluorides it is raised to 61.9.—Moniteur Quesneville, through Chem. News, July 3, 1891, 12.

*Starch—Formation from Formaldehyde.*—Th. Bokorny has succeeded in establishing direct proof of the hypothesis of Baeyer, that starch is formed by polymerization of formaldehyde, which itself is derived from carbonic oxide. The use of formaldehyde itself is excluded because of its poisonous nature. With methylal Bokorny was more successful, but the results were open to the objection that the formation of starch might be due to methyl alcohol. He therefore started with sodium oxymethyl sulphonate, which is readily broken up into formaldehyde and acid sodium sulphite: $OH.\ CH_2.\ SO_3Na \doteq CH_2O + HSO_3Na$. By condensation the carbohydrate is formed. To prevent the injurious action of the acid sulphite some

dipotassium phosphate is added, which goes to form neutral sulphite and monopotassium phosphate. The culture-solution contained calcium nitrate 0.1 p. c., potassium chloride 0.05 p. c., magnesium sulphate 0.02 p. c., monopotassium phosphate 0.02, and a trace of ferric chloride; to this was added sodium oxymethylsulphonate 0.1 p. c. and dipotassium phosphate 0.1 p. c. Bokorny placed Algæ (Spirogyra majuscula) in this culture-solution, taking care to exclude even traces of carbon dioxide; exposure to light, however, was found to be necessary. After 5 days enormous quantities of starch were found in the Algæ.—Pharm. Post, 1891, 462, through Amer. Jour. Pharm., 1891, 403.

*Starch—Estimation in Cereals.*—Guichard saccharifies the starch by means of 10 per cent. nitric acid instead of hydrochloric acid. He states that the saccharification occurs much more rapidly, and that the liquids will not be colored so dark, as to necessitate decolorization by subacetate of lead or bone-charcoal. The polarization is not influenced by the oxidizing action of the nitric acid. Guichard takes about 4 gm. of the finely ground cereals, and boils it (for one hour) with 100 c.c. of 10 per cent. nitric acid in a flask of about 500 c.c. capacity, provided with an upright condenser, filters it, and examines it with a polarimeter. This will give the glucose, from which the starch is easily calculated.—Chem. Zeitg., Rep., 1892, 154, from Journ. Pharm. Chim., 1892, xxv., 394.

*Starch—Oxidation Product.*—On treating 4 parts of starch, containing 20 per cent. of water, 5 parts of nitric acid, P. Petit obtained a compound of the composition $C_5H_6O_6$. This substance if thrown in fine powder into a concentrated solution of phenylhydrazine acetate, yields, at about 60°–70° C., a crystalline hydrazone.—Chem. News, 1892, lxv., 311, from Comptes rendus, 1892, cxiv.

*Analysis of Commercial Starches.*—A. Baudry (*"La Pomme de terre industrielle,"* through *L'Union Pharm.*, 1892, 63) proposes an analysis based on the following facts: (1) Salicylic and benzoic acids completely dissolve starch on heating; (2) the soluble starch is dextrorotary; (3) the deviation is proportional to the amount of dissolved starch for the same length of tube. The manner of applying this method is the following: 3.321 gm. starch, to be analyzed, is placed with 80–90 c.c. water in a flask of 200 c.c. contents. To this is added 5 gm. salicylic acid, the whole boiled from 20–25 minutes, then sufficient cold water is added to make about 190 c.c, and the contents are then cooled. Lastly 1 c.c. ammonia is added, the quantity made up to 200 c.c., shaken and filtered. The liquid is examined in a 400 mm. tube, giving the amount of anhydrous starch in the sample, if a saccharimeter is used whose 100 division correspond to 10 gm. saccharose (Vivian). If a Laurent saccharimeter is used where the divisions correspond to 16.198 saccharose, only 2.688 gm. of starch are to be employed. In this case the number of degrees observed multipled by 2 gives

the percentage. For determining the quantity of impurities it is only necessary to filter the soluble starch through two equipoised filters, one placed within the other, and then washing the residue with boiling water until the filtrate gives no reaction with ferric chloride. The filters are then dried and weighed.—Am. Jour. Pharm., 1892, 192–193.

*Starch and Crude Fibre—Estimation.*—M. Hoenig gives the following directions: The finely powdered material is placed with glycerin in a test-tube supported in a flask containing concentrated sulphuric acid and gradually heated to 210° C., the decomposition is complete in about 30–45 minutes, the tube is then cooled to 130° C., the contents poured into 95 per cent. alcohol, the tube rinsed out with water, and ether added. The precipitate is washed with a mixture of alcohol and ether (5 : 1), drained and boiled with water, the starch dissolves, and when all the alcohol has been driven off, is inverted and estimated with Fehling's solution; the cellulose, which is always free from nitrogen, is then washed, dried, weighed, ignited, and the weight of the ash deducted. Filtration is facilitated without any danger of seriously attacking the cellulose, by heating the mixture of starch and cellulose with dilute hydrochloric acid.—Jour. Chem. Soc., July 1891, 865, from Chem. Zeitg., xiv., 868, 902.

S. Gabriel has examined the method of Hoenig, which is based on the observation that both albumen and starch are rendered soluble on being heated with glycerin to 210° C., whilst cellulose is not attacked at all. Gabriel finds that the sulphuric acid bath can conveniently be replaced by the naked flame, which can be better managed, and then that glycerin by itself is not the best liquid for this purpose, but that a solution of 33 gm. of potassa in 1 liter of glycerin, and heating to only 180° C. is better. On heating it, regard must be had to the violent reaction and foaming.—Chem. Zeitg., Rep., 1892, 132, from Zeitschr. physiolog. Chem., 1892, 370.

*Iodide of Starch.*—Rouvier concludes from his experiments that in the presence of an excess of starch an iodine compound is formed different from that formed in presence of an excess of iodine, and not hitherto observed.—Pharm. Jour. Trans., Feb. 1892, from Comptes rendus, 1892, cxiv., 128, 749.

*Flour—Microscopical Examination.*—M. Holz made an observation which may be of use in the microscopical examination of flour and kindred powders. Flour is stirred with sufficient of 5 per cent. carbolic acid water, to form a paste, and allowed to stand for 15 to 24 hours. The particles of seed-coat and epidermis will be found stained a dark reddish-brown, bordering on violet. He also found that on moistening flour with a 1 per cent. alcoholic solution of phloroglucin, followed afterwards with concentrated hydrochloric acid, the flour is stained pinkish to dark-red, which renders the coarser particles more prominent.—Apoth. Zeitg., 1892, 42.

*Dextrin—Formation.*—According to Payen, dextrin is obtained by heating starch to a temperature of 100° to 140° C., the starch having previously been moistened with a small quantity of nitric acid. As the dextrin thus obtained almost always has some reducing action upon Fehling's solution, M. R. Petit has examined the influence of different proportions of acid, and that of the time of heating, on the character of the product. In this examination he adopted the following data based upon trials with a known mixture of starch, non-reducing dextrin, and glucose.

(1) By digesting this mixture with water at from 40° to 50° C. for half an hour, the glucose and dextrin are completely dissolved, and the starch can be collected by filtration.

(2) The rotatory power of the solution corresponds exactly with the sum of those of the glucose and the dextrin.

(3) If the solution is fermented after having added ammonium phosphate and potassium sulphate, the loss of rotatory power indicates exactly the amount of glucose introduced, and the fermented liquid no longer acts upon Fehling's solution.

The dextrin obtained by heating starch for an hour at 125° C. still contains a minute quantity of starch, which becomes inappreciable when the nitric acid used amounts to 0.8 and 2 per cent. The following table shows the reducing power indicating the amount of material capable of reducing Fehling's solution, when expressed as glucose for 100 of dextrin.

| Percentage of acid. | Time of heating. 1 h. | 2 h. | 3 h. | 4 h. | Starch unaltered for one gm. of dextrin. |
|---|---|---|---|---|---|
| 0.2 | 3.9 | 5.06 | 3.6 | 2.8 | 0.003 |
| 0.3 | 7.2 | 5.3 | 3.6 | 3.0 | 0.002 |
| 0.5 | 7.3 | 6.07 | 4.2 | 3.1 | 0.001 |
| 0.8 | 8.06 | 6.3 | 4.5 | 4.0 | traces. |
| 2.0 | 9.5 | 7.1 | 5.4 | 4.5 | traces. |

These results show that (1) For a given amount of acid the reducing power decreases sensibly as the time of heating is increased. (2) For a given time of heating the reducing power is increased when the amount of acid is increased. Other trials between 100° and 140° C. showed that for a given amount of acid the decrease of the reducing power was more rapid as the temperature was higher, and that the reducing power was increased more rapidly for a given amount of acid and a given time of heating when the temperature was highest. This observation explains the fact that certain kinds of dextrin have scarcely any reducing power; very long continued heat, extending to 60 or 70 hours, being applied in the manufacture.—Pharm. Jour. Trans., April, 1892, 831; from Comptes rendus, 1892, cxiv., 76.

## SUGARS.

*Sugar—Estimation.*—H. Pellet is stated to have not only simplified the usual process for estimating sugar, but also to have improved the saccharometer so that it empties, cleans, and refills itself almost automatically. It is claimed that by these simplifications 2,500 to 3,000 analyses can be made in ten hours by unskilled persons, after a slight experience.—Chem. Drug., Sept. 1891, 474.

*Sugar—Test for Minute Quantities.*—Mueller and Ohlmer make use of the property of alpha-naphthol to produce a red coloration with humin-substances, which latter are formed from sugar by the action of acids.

Into a test-tube of about 2 cm. in diameter and 10 cm. high pour 2 c.c. of the sugar solution, then 5 drops of a 20-per cent. alcoholic solution of pure alpha-naphthol, and at last 10 c.c. of pure concentrated sulphuric acid, which is perfectly free from nitric acid, and shake vigorously. After some five minutes the red coloration will be at its maximum. With 0.1 per cent. of sugar the color is intensely reddish-violet; 0.01 per cent., the color of claret; and with 0.001 per cent. the color is distinctly pink, although faint. Calcium salts, chlorides, ammonia, organic substances (but not carbohydrates) do not prevent the reaction, but traces of nitric acid do.

Thiele states that even as little as 0.00001 per cent. will be indicated by proceeding as follows: To 0.5 c.c. of the liquid to be examined add only one drop of a 4 per cent. alcoholic solution of alpha-naphthol, and finally 1 to 2 c.c. of concentrated sulphuric acid, and shake vigorously. After a while a faint but distinct pink coloration will appear.—Chem. Zeitg., Rep., 1892, 126; from Zucker-Ind., 1892, 419, 456.

*Sugar—Estimation of the Inorganic Constituents of Saccharine Matter.*—Alberti and Hempel estimate the inorganic constituents directly as follows: Five gm. of the sugar is mixed with 6 to 7 gm. of the coarsely powdered freshly ignited quartz-sand, transferred to a platinum dish, holding about 35 c.c., and heated in a platinum muffle. The sugar is incinerated quietly and without frothing, usually in about one hour. The ash is free from carbonic acid, and contains the alkaline chlorides and sulphates perfectly undecomposed. It is advisable to duplicate the incineration; and it would perhaps be better to use gold-plated utensils, in place of platinum, which is not inconsiderably attacked.—Chem. Zeitg. (Rep.), 1891, 227, from Zucker-Ind.

*Sugar—Solubility in Water.*—A. Herzfeld has re-examined the solubility of crystallized cane sugar in water, using special precautions to insure saturated solutions at the several temperatures at which the determinations were made, and with the most careful control of temperature. He found that all previous tables of solubilities of sugar needed more or less correction.

The curve of solubility for any given degree of temperature and for 100 parts of water, was determined (by the method of least squares) to be

$$0.0005307x^2 + 0.13477x + 64.1835$$

where $x$ denotes degrees of centigrade. Hence we obtain, for 15° C.:

$$0.1184075 + 2.02155 + 64.1835 = 66.32$$

The following condensed tables shows the solubilities of sugar in 100 parts of water at various temperatures:

| Temp. ° C. | Sugar. Parts. | Temp. ° C. | Sugar. Parts. |
|---|---|---|---|
| 0 | 64.18 | 55 | 73.20 |
| 5 | 64.87 | 60 | 74.18 |
| 10 | 65.58 | 65 | 75.18 |
| 15 | 66.32 | 70 | 76.22 |
| 20 | 67.09 | 75 | 77.27 |
| 25 | 67.89 | 80 | 78.36 |
| 30 | 68.70 | 85 | 79.46 |
| 35 | 69.55 | 90 | 80.61 |
| 40 | 70.42 | 95 | 81.77 |
| 45 | 71.32 | 100 | 82.97 |
| 50 | 72.25 | | |

—Am. Drug., 1892, 140, from Zeits. Ruebenzucker Ind.

*Sugar Solution.*—J. Alfred Wanklyn and W. J. Cooper have ascertained that when sugar dissolves in water no contraction takes place, and the volume of the solution is equal to the volumes of sugar and water. From the specific gravity of sugar (1.590 at 20°C.) the volume is easily calculated, by merely dividing the weight in gm. by the sp. gr. we obtain the volume in c.c. The customary tables of sp. gr. of solutions are so constructed as to mask the simple relation between the strength and the sp. gr. By changing the tables, however, the regularity becomes manifest.

| No. of Gms. of sugar in 100 c.c. solution. | Spec. Grav. |
|---|---|
| 1 gm. | 1.00371 |
| 2 | 1.00742 |
| 3 | 1.01113 |
| 4 | 1.01484 |
| 5 | 1.01855 |
| 10 | 1.03710 |
| 20 | 1.07420 |
| Each gm. raises the sp. gr. to the extent of | .00371 |

—Chem. News, July 1891, 17, 24, 27, 39.

*Glucose—Fehling's Solution Improved.*—Rossel recommends to replace the tartaric acid by glycerin, which will insure a permanent solution. (Loew recommended the same modification in 1871, see Proceedings, xix., 258). Dissolve 34.56 gm. of pure copper sulphate in water, add 150 gm.

of pure glycerin (not contaminated with acrolein), and then an aqueous solution of 130 gm. of potassa, finally completing the solution by adding water up to 1,000 c.c. 1 c.c. of this solution indicates 5 mgm. of glucose. —Chem. Zeitg. (Rep.), 1891, 343, from Schweiz. Woch.-Schr. Pharm., 1891, 442.

See further under *Urine*.

*Glucose, destruction* by a *ferment* in the *Blood*, see under *Blood*.

*Glucosoxime and Levulosoxime*.—A. Wohl describes and gives the reactions of these two bodies, of which glucosoxime is deposited in crystals when an alcoholic solution of anhydrous glucose and hydroxylamine is kept for 6 to 8 days at the ordinary temperature; it melts at 135° C., and does not decompose on prolonged heating at 100° C. Levulosoxime can be prepared in a similar manner, but is obtained in the form of a syrup which crystallizes on keeping over sulphuric acid; it melts at 118° C.—Journ. Chem. Soc., July 1891, 813, from Ber., xxiv., 993.

*Fruit-Sugar* (*Levulose*).—It is stated that levulose is now manufactured at Schering's chemical works at Berlin on such a scale that there is some prospect of its being used as a sweetener by diabetic patients. It appears now in the form of a snow-white, crystalline powder of intense sweetness and ready solubility.—Chem. Drug., May 1892, 744.

*Synthetic Sweetener*.—Berlinerblau has patented a new sweet compound, which is para-phenetol carbamide. As formerly prepared, by the action of potassium cyanide upon para-phenetidin hydrochloride, it was liable to retain the cyanogen compound. Thoms replaces potassium cyanide with carbonyl oxychloride (phosgene). One molecule of this in benzol or toluol solution reacting with two molecules of para-phenetidin to form $C_6H_4OC_2H_5NHCOCl$, and, by acting upon this with ammonia, $NH_2$ takes the place of Cl in the formula, para-phenetol carbamide, $C_6H_4OC_2H_5NHCONH_2$, thus being produced. This compound is obtained in colorless crystalline needles, which melt at 160° C.—Drug. Circ., 1892, 108, from Pharm. Centralh.

*Dulcitol and Mannitol—Fermentation*.—Percy F. Frankland and W. Frew have discovered the bacillus which ferments both dulcitol and mannitol, the products being ethyl alcohol, acetic and succinic acids, hydrogen and carbonic acid, probably according to the following equation:

$$3C_6H_{14}O_6 = 4C_2H_6O + C_2H_4O_2 + C_4H_6O_4 + CH_2O_2 + 2CO_2 + 2H_2.$$

In view of the products to which this bacillus gives rise, the author proposes to name it "Bacillus ethacetosuccinicus." The fermentation induced by this bacillus differs fundamentally from that resulting from the Bacillus ethaceticus and from Friedlaender's Pneumococcus, neither of which has the power of fermenting dulcitol.—Journ. Chem. Soc., 1892, lxii. (Trans.), 254–277.

*Milk Sugar—Estimation.*—In order to get a clear filtrate, A. H. Gill makes use of the property of aluminium hydrate to drag down precipitates, and, beside, follows the suggestions of Radlsicu regarding the amount of acid, intensity and duration of heating, all of which are of importance in the rapidity and completeness of the curdling. Gill proceeds as follows:

25 c.c. of milk are mixed with 15 c.c. of "alumina milk" (see below), and 0.5 c.c. of 25 per cent. acetic acid added, the mixture stirred and heated for five to seven minutes on a water-bath (85° C.); 100 c.c. of water are now added and the mixture heated in boiling water for ten minutes, with frequent stirring. The flask is thoroughly cooled under a hydrant, allowed to settle, and decanted through a plaited filter into a 500 c.c. graduated flask, being careful to bring as little precipitate upon the filter as possible. The operations of boiling and filtering are repeated three times, and the filtrates made up to 500 c.c. It is then ready for titration with Fehling's solution in the usual way.

The "milk of alumina" is prepared by precipitating at the boiling temperature 125 gm. of ammonia alum with ammonium hydrate, washing the precipitate by decantation, and making it up to 1 litre.—Am. Drug., 1892, 11, from Journ. Analyt. and Appl. Chem.

*Gallisin.*—C. Scheibler and H. Mittelmeire find that this substance is wanting in all the properties of a definite chemical compound, and the formula $C_{12}H_{24}O_{10}$, assigned to it by Cobenzl, Rosenbeck and Schmitt (Proceedings 1890, xxxviii., 648), can not be regarded as based on established facts. Gallisin, purified by repeated precipitation by alcohol from its aqueous solution, is a colorless, amorphous, very hygroscopic substance; the aqueous solution has a neutral reaction, and a powerful reducing action on Fehling's solution. When the aqueous solution is heated at 100° C. for about an hour with phenylhydrazin acetate, and then allowed to cool, a considerable quantity of a yellow osazone is deposited. This compound, purified by recrystallization from hot water, has the composition $C_{24}H_{32}N_4O_9$.—Yearbook Pharm., 1891, 105, from Ber., xxiv., 301–305.

*Trehalose.*—Maquenne concludes from his experiments that trehalose is an octohydric alcohol, isomeric with the true saccharoses, and very similar to maltose in its molecular constitution, but having no aldehydic function.—Journ. Chem. Soc., Sept. 1891, 1000, from Comptes rendus, cxii., 947–950.

*Volemit—A New Sugar.*—E. Bourquelot has found in Lactarius volemus a peculiar sugar, which he proposes to name volemit. Its taste is faintly sweet, it melts at 140 to 141° C., and is easily soluble in water, with difficulty in cold alcohol. Its rotatory power is a little to the right (about 2.5° at 14° C.). Volemit does not reduce Fehling's solution, even after boiling with diluted sulphuric acid, and does not ferment with beer-yeast, nor is osazon formed on heating it for one hour with phenylhydrazin.—

Chem. Zeitg., Rep., July, 1891, 186, from Bot. Centralb., 1891, xii, 21; Am. Journ. Pharm., 1891, 465.

*Xylose—Preparation.*—G. Bertrand obtains it from wheat or oat straw by extracting the straw with tepid water, and then boiling it for several hours with dilute (1 to 2 p. c.) sulphuric acid. The liquor, after the removal of the sulphuric acid by barium hydroxide, is concentrated on the water-bath, and treated with alcohol, thus yielding an extract from which xylose is obtained as a yellow syrup on removing the solvent. On addition of a crystal of xylose, the syrup crystallizes. The yield from wheat straw is two per cent., from oat straw, four per cent. With sodium amalgam "xylitol" is obtained.—Journ. Chem. Soc., 1892, lxi. (Abstr.), 28, from Bull. Soc. Chim., 1891, 554-557, 740–742.

## ORGANIC ACIDS.

*Organic Acids—Affinity Determined by Means of Lacmoid.*—F. Roehmann and W. Spitzer observed during the titration of organic acids with soda, that a drop of the liquid brought into contact with red lacmoid paper produces a blue color before sufficient soda has been added to form the normal salt; the solution will turn blue lacmoid paper red, but this red color disappears before the acid is entirely neutralized. This reaction depends on the fact that the alkali is divided between the lacmoid and the organic acid in a definite proportion, which varies according to the nature of the acid; a method is thus afforded of determining the relative affinities of acids for alkali.—Journ. Chem. Soc., 1892, lxi. (Abstr.), 37, from Ber., 1891, xxiv., 3010–3015.

*Diluted Acetic Acid.*—Frank Miller examined 20 samples, and found the strength to vary from 1.80 to 16.20 per cent., the requirement being six per cent.—Am. Journ. Pharm., 1892, 183.

*Acetic Fermentation—Action of Light.* — M. Giunti found that direct sunlight hinders the development of Mycoderma aceti, and consequently the acetic fermentation; even diffused daylight hinders the development if the surface of the liquid is not shaded. Prolonged sunlight did not, however, sterilize the liquid inoculated with Mycoderma, but it might be possible to hinder the formation of acid in wines in this way.—Year-book Pharm., 1891, 105, from Chem. Centralb., xix., 490.

*Vinegar—Test for Mineral Acids.*—According to Payen's old process, boiling 100 c.c. of vinegar for half an hour with 0.05 gm. of starch, the starch will respond to the iodine test, in the absence of mineral acids, whilst in the presence of even 0.2 per cent. of sulphuric acid all the starch will have become converted into dextrin or glucose, and consequently give no blue coloration with iodine. F. Corril has recently stated that he obtained the iodine reaction with vinegar containing 0.4 per cent. of sulphuric acid, or 0.5 per cent. of nitric or hydrochloric acids.—Am. Drug., 1892, 103.

*Magnesium Acetate—With Magnesia.*—Kuble mentions that a mixture of calcined magnesia with a solution of magnesium acetate is strongly deodorant, and is the chief constituent of the so-called "Sinodor" preparations of the trade (which see).—Archiv Pharm., 1892, ccxxx., 173.

*Magnesium Acetate with Oxide of Lead.* See under *Liquor Plumbi Subacetatis.*

*Acetates—Volumetric Estimation.*—Claude C. Hamilton recommends the following method as being quicker and quite as accurate as the orthodox oxalic acid or ignition methods. This method is based on the property of methyl violet to change its violet color to blue or green in the presence of mineral acids, while the color remains unaltered when only acetic acid is present. Since there can be no free mineral acid present till all the acetate has been decomposed, the violet color will not change until the first drop in excess of the mineral has been added, and we can therefore calculate the amount of acetate present by measuring the quantity of acid necessary to produce the blue color. The acid (best, seminormal sulphuric acid) must be added from a burette at the rate of 85 drops per minute, and the solution of the acetate kept at a boiling temperature. The author appends the following table which will aid the operator in making these estimations without the use of equations. Dissolve the weight named of the salt in water, add methyl violet solution (5 drops of a 1 per cent. solution in dilute alcohol), heat to boiling, and let the acid flow in from a burette till the violet color is changed to blue, then calculate the amount of acetate.

| | Weigh. | Each c.c. of acid indicates of acetate. |
|---|---|---|
| Plumbi acetas | 9.46 gm. | 2 per cent. |
| Liquor plumbi subacetatis | 13.7 " | 1 " |
| Potassii acetas | 4.9 " | 2 " |
| Sodii acetas | 3.4 " | 4 " |
| Zinci acetas | 5.92 " | 2 " |
| Liquor ammonii acetatis | 38.5 " | $\frac{2}{10}$ " |
| Liquor ferri acetatis | 7.76 " | 1 " |
| Tinctura ferri acetatis | 7.76 " | 1 " |

—Am. Drug., 1891, 263, 356.

——— Charles Caspari, Jr., points out that C. C. Hamilton in his article on the above subject, in his calculations makes use of a normal acid twice as strong as that usually employed by analysts, and that therefore the table given by the author must be corrected as follows:

| | Weigh. | Each c.c. of acid indicates of acetate. |
|---|---|---|
| Plumbi acetas | 9.46 | 1 per cent. |
| Liquor plumbi subacetatis | 6.85 | 1 " " |
| Potassii acetas | 4.90 | 1 " " |
| Sodii acetas | 6.80 | 1 " " |
| Zinci acetas | 5.92 | 1 " " |
| Liquor ammonii acetatis | 3.85 | 1 " " |
| Liquor ferri acetatis | 3.88 | 1 " " |
| Tinctura ferri acetatis | 3.88 | 1 " " |

The foregoing calculations have been made on the basis of the U. S. Ph. chemical formulas, using seminormal sulphuric acid. For the justification of his strictures reference must be had to the original paper.—Am. Drug., 1891, 314.

*Anacardic Acid Used as Hair-dye.*—See under *Hair dye* in "Miscellaneous."

*Angelic Acid.*—E. Schmidt found a sample of angelic acid 25 years old which was pure methylcrotonic acid, and supposed that the conversion had come about by long keeping, especially as Demarcay has shown that the application of heat causes the change; further examination of other samples, even 50 years old, shows that angelic acid can be kept unchanged. Schmidt thinks it probable that the acid is a decomposition product of some unknown compound occurring in the root.—Journ. Chem. Soc., Aug. 1891, from Arch. Pharm., (2) xxix., 68–71.

*Assamic Acid and Assamin.* See under *Assam Tea* in "Materia Medica."

*Benzoic Acid from Gallic Acid.*—See under *Gallic Acid.*

*Benzoylchloride—Commercial.*—Victor Mayer points out that the commercial benzoylchloride often is prepared from toluol-benzoic acid, and therefore liable to be contaminated with chlorbenzoylchloride. This can easily be proven by decomposing with an alkali, and then examining the benzoic acid for chlorine. Mayer once found 1.5 per cent. chlorine.—Pharm. Centralh., 1892, 121.

*Sodium Benzoate.*—Henry F. Kaercher found that the commercial salt, as ordinarily prepared by crystallization, is of variable strength, containing all the way from 4 per cent. to 18 per cent. of moisture. He therefore proposes that it should be made anhydrous, in order to insure uniformity. Made with resin-benzoic (sublimed) acid the salt has a much more palatable taste than that made synthetically from toluol. The best way to determine whether sodium benzoate is anhydrous is to estimate the benzoic acid; precipitate an aqueous solution with dilute hydrochloric acid, and take up the benzoic acid with ether.—Am. Jour. Pharm., 1892, 185.

*Cathartic Acid.*—Thomas Smith has obtained a crystalline principle separated from a strong alcoholic tincture of senna leaves, which he thinks is true cathartic acid. The acid was precipitated as a lime salt, of which about 230 grains were obtained from 45 ounces of the leaves. He found that a solution of the lime salt of such a strength that one fluid ounce corresponded to one ounce of the leaves acted as an efficient purge in doses of 60 minims without causing the slightest griping.—Pharm. Journ. Trans., April 1892, 852.

*Cerotic Acid.* See under *Wax* in "Animal Drugs."

*Citric Acid—Melting Point.* See p. 1018.

*Iron Citrates.* See under *Ferrum.*

*Cinnamic Acid—Preparation.*—According to L. Claisen ethyl cinnamate is first prepared by slowly adding benzaldehyde to sodium wire, contained in an excess of ethyl acetate. The mixture is allowed to stand a short time, and is then treated with water and acetic acid. After separating the aqueous solution and distilling off the unaltered ethyl acetate, an oily liquid is left which boils at 260°–270° C., and from which cinnamic acid is obtained by hydrolysis. The yield of ethyl cinnamate is 100 to 110 per cent. of the weight of the benzaldehyde employed. Ethyl benzalbutyrate is obtained in a similar way by employing butyrate and benzaldehyde.

The reaction may be explained by supposing that benzaldehyde, ethyl acetate and sodium form the sodium compound of ethyl-phenylhydroxypropionate, and that the free ethereal salt obtained after acidifying is decomposed on distillation into ethyl cinnamate and water.—Yearbook Pharm., 1891, 81; from Ber., xxiii., 976–978.

*Cinnamic Acid—Properties and Uses.*—Dr. T. L. Phipson found that by keeping a small quantity of the acid for a few days in contact with sulphuric acid and potassium bichromate, without heating, the odor of hawthorn flowers thus produced is gradually changed into an intense odor of honey. He also states that a spray of essence of cinnamon has been found more effective in the treatment of all forms of malarial fever than the usual treatment by quinine and arsenic.—Am. Drug., July, 1891, 219, from Chem. News.

*Citric Acid* in *Milk.* See under *Milk.*

*Citric Acid,* estimation in *Wine.* See under *Wine.* (Vitaceae).

*Lithium Citrate.* See under *Lithium.*

*Citric Acid—Detection of Tartaric Acid.*—According to L. Crismer, a 20 per cent. solution of ammonium molybdate is poured over 1 gm. of the acid (in a test tube) and 2 or 3 drops of a diluted solution of pure hydrogen peroxide are added. After heating for three minutes on a water-bath the liquid will retain its yellow color, but in the presence of small quanti-

ties of tartaric acid the color will have turned bluish or blue. This reaction is stated to indicate 0.001 gm. in 1 gm.—Apoth. Zeitg., 1891, 384.

*Citric Acid—Detection of Lead.*—Th. Pusch recommends to take a solution of 5 gm. of the acid, adding sufficient of ammonia to leave a trifling excess of acid and place the beaker on a piece of white paper, testing for lead with hydrogen sulphide.—Pharm. Post, 1891, 1107.

*Citric Acid—Melting Point.*—The melting point is generally given at 100° C. (also U. S. P.). E. Buchner and H. Witter state that this is erroneous. The acid begins to shrink when heated to between 70°–75° C., a portion of the water being then lost. When further heated it undergoes but little change, until a temperature of 135°–152° C. is reached, between which it becomes anhydrous and melts; the melting-point being the lower the more rapidly it is heated.—Am. Drug., 1892, 167.

*Formic Acid—Estimation in Presence of Acetic and Butyric Acids.*—A. Scala estimates formic acid by a method somewhat different from that of Moerk (see Proceedings 1888, xxxvi., 525).

Heat the liquid to be tested in a deep beaker with a saturated solution of mercuric chloride on a water-bath for two hours, the beaker being covered. Should the acid be present in a free state, it must first be neutralized. At the end of the two hours the precipitated mercurous chloride is collected on a weighed filter, washed with warm water, dried at 100° C., and weighed; from the weight that of the formic acid can easily be calculated.—Yearbook Pharm., 1891, 123, from Gazzetta, xx., 393–396.

*Gallic Acid—Transformation into Benzoic Acid.*—A mixture of ammonia and zinc powder is placed in a flask closed with a stopper, through which passes a tube drawn out to a point. Heat is applied, and when the evolution of hydrogen is quite regular, a hot solution of gallic acid is gradually added. If the temperature is kept at 60° C., the acid is completely transformed in a few hours, being first changed into salicylic and then into benzoic acid.—Ch. Er. Guignet, Chem. News, 1891, lxiv., 85, from Comptes rendus, July 1891, cxiii., 200.

*Dermatol,* name proposed for basic gallate of bismuth and recommended as a substitute for iodoform, according to Dr. B. Fischer, can be prepared by dissolving 15 parts of bismuth subnitrate in 30 parts of glacial acetic acid, adding 200 to 250 parts of water, and filtering. To the filtrate add with constant stirring a warm solution of 5 parts of gallic acid in 200 to 250 parts of water. The resulting yellow precipitate, after settling, is separated by decantation, and washed on a filter until the wash-water no longer shows a nitric acid reaction with diphenylamin; it is then dried at 100° C. It should not yield anything to alcohol, and should not yield less than 55 per cent. of bismuth oxide (theory demands 56.66 per cent).—Am. Jour. Pharm., 1891, 408, from Pharm. Zeitung, 1891, 400.

*Dermatol—Test for Purity.*—Neither alcohol nor ether must dissolve

anything from one gm. (free gallic acid); 0.5 gm. must dissolve clear in 5 c.c. of soda solution (other bismuth salts would form insoluble oxide). One gm. calcined in a porcelain crucible and dissolved in diluted sulphuric acid, should not give any indication of arsenic in Marsh's apparatus. A fragment of diphenylamin dissolved in 5 c.c. of concentrated sulphuric acid, and a solution of 0.5 gm. of dermatol in 3 c.c. of diluted sulphuric acid added carefully, should not at once be colored blue (nitric acid.)—Chem. Zeitg. (Rep.), 1891, 198, from Pharm. Zeitg., 1891, 400.

*Dermatol—Preparations.*—Owing to its non-poisonous nature and its capability of being sterilized dermatol is claimed to be superior to iodoform; forming an impalpable powder, it can be applied with an atomizer. The following formulas for its application have been published: *Dermatol-ointment:* Dermatol, 10.0; lanolin, 20.0; vaselin, 70.0. *Dermatol-zinc-vaselin:* Dermatol, 2.0; zinc oxide, 2.0; vaselin, 20.0. *Dermatol-zinc-paste:* Dermatol, 2.0 to 5.0; zinc oxide, 24.0; wheat starch, 24.0; vaselin, 50.0. *Dermatol-zinc-gelatin:* Dermatol, 5.0; zinc oxide, 5.0; gelatin, 30.0; glycerin, 30.0; distilled water, 30.0. As a *dusting powder* for fetid feet the following has been recommended: Dermatol, 20.0; talcum, 70.0; and starch, 10.0. Other forms of application for special purposes are Dermatol-collodium-emulsion, 10 per cent.; Dermatol-glycerin-emulsion, 10–20 per cent.; Dermatol-gauze, 10–20 per cent.; and Dermatol suppositories.—Am. Jour. Pharm., 1891, 458, from Pharm. Zeitg., 1891, 480.

*Gallic Acid, distinction from Tannic Acid.* See under *Tannic Acid.*

*Lactic Acid—Preparatoin.*—George Jacquemin adds the pure lactic ferment, prepared by Pasteur's method, with a quantity of pure, sterilized calcium carbonate, to a wort at 45° C. Fermentation is conducted at that temperature, care being taken to exclude dust, to admit filtered air at the bottom of the vessel, and to allow the carbonic acid to escape. Fermentation is complete in five or six days, and the solution of calcium lactate is freed from nitrogenous matters by the addition of tannic acid. The calcium lactate crystallizes out on evaporation of the filtrate.—Chem. News, 1891, lxiv., 62, from Bull. Soc. d'Encouragement.

*Lactic Acid Sticks.*—Zippel proposes to use lactic acid in the form of sticks for tuberculous fistulas, etc. 50 gm. each of gelatin, lactic acid and water are melted at a gentle heat, 30 gm. of menthol added and poured into moulds. After allowing the mould to remain in the ice box for 24 hours, the sticks are taken out, and dried over calcium chloride. The sticks are afterwards coated with collodion, or kept under oil, to prevent deliquescence.—Zeits. Oester. Apoth. Ver., 1892, 222.

*Iron Lactate.* See under *Ferrum.*

*Malic Acid—Titration.*—Carl Micko finds that malic acid cannot be titrated with potassium permanganate, as might be expected, because, beside carbonic acid and water, a not inconsiderable proportion of acetic acid is formed.—Zeits. Oester. Apoth.-Ver., 1892, 197.

*Oxalic Acid—Physiological Effects.*—Kobert confirms his former statement that not only oxalic acid, but also its acid and neutral salt, cause glycosuria if given even in small quantities; the internal use of extract of Syzygium jambolanum promptly removes the glycosuria.—Am. Journ. Pharm., 1891, 538, from Pharm. Centralh., 1891, 569.

*Pyrogallol—Melting Point.*—The "Chemist & Druggist" calls attention to the discrepancy in the melting point given in most English text-books and the German Pharmacopœia: the first ones giving it as 115° C., and the latter as 131° C. It is stated in explanation that the acid melting at 115° C. is the orthodox one, made by heating gallic acid, whilst that melting at 131° C. is produced as a by-product, apparently from tannic acid marcs. According to Vogel, the acid with the higher melting point is the best for photographic purposes. The reason for this difference has not been cleared up as yet.—Chem. Drug., May 1892, 773.

*Gallacotophenone—Substitute for Pyrogallol.*—L. v. Rekowski has found that gallacotophenone—the "alizarin-yellow C" of Nencki—is an excellent substitute for pyrogallol, which has the great advantage not to be poisonous, no doubt due to its very slow oxidation in alkaline solution; it is even possible to form alkaline salts. It is a light-yellow powder scarcely soluble in cold water (18:10,000), easily in hot water, alcohol, ether and glycerin.—Pharm. Post, 1891, 809. Pharm. Zeitg. prefers to call it "gallaceto-phenone."

*Rhodanic Acid—Constitution.*—According to A. Miolati, rhodanic acid can be obtained (1) by heating thiohydantoin with excess of carbon bisulphide in alcoholic solution; (2) by warming ethyl chloracetate with an alcoholic solution of ammonium dithiocarbamate and hydrochloric acid; (3) by treating ethyl thiocyanoacetate with hydrogen sulphide in alcoholic solution. It crystallizes in yellowish prisms and melts at 166–167° C. with decomposition. These syntheses show that the acid is an α-keto-μ-thiothiazolidine of the constitution $CH_2<\begin{matrix} S\text{—}SH \\ | \\ CO.NH \end{matrix}$.—Journ. Chem. Soc., Aug. 1891, 943, from Annalen, cclxii., 82–88.

*Salicylic Acid—Reaction.*—Schneegans and Gerock find that the violet color resulting from a mixture of 10 c.c. of a 0.2 per cent. solution of salicylic aldehyde with 2 c.c. of a very dilute solution of perchloride of iron, may be removed by shaking it with 5 c.c. of chloroform or ether. But if only 0.0002 gm. of salicylic acid be added, the violet color remains persistent. A similar reaction occurs with methyl salicylate, and may be used to detect as little as 1 part of free acid in 500 parts of artificial oil of gaultheria.—Pharm. Jour. and Trans., Jan. 1892, 609; from Jour. Pharm. Els.-Lothr., 1891, 285.

*Salicylic Acid—Artificial.*—Helbing and Passmore find that the melting

point of pure acid is slightly below 157° C. (exactly, 156.85° to 156.86° C.), and they find that fractionation of the silver salt is the quickest and surest means of determining the purity, since any cresol derivatives which may be present accumulate and come out in the last fractions. A known weight of the acid is first converted into the sodium salt, and freed from carbonic acid by adding a trace of nitric acid, and boiling. During ebullition a 10 per cent. solution of silver nitrate is added in sufficient quantity to precipitate from a tenth to a fifth of the salicylic acid. After the first fractionation with silver, a second, third, and fourth, or even more, may be made, using increased quantities of silver nitrate until 50 or 60 per cent. of the acid has been precipitated, and then decreasing the size of the fractions. Much depends on the initial melting point of the acid ; should this be low, it is advisable to keep the larger fractions towards the end, so as to accumulate the impurities in them. The acid is regenerated from the silver salicylate by digestion with boiling water and an excess of hydrochloric acid, the mixture filtered, the salicylic acid crystallized twice, and dried. The melting point of each fraction is then determined. Fischer found that the presence of 1 per cent. of cresotic acid lowered the melting point of salicylic acid by about 1° C. ; it is therefore obvious that these last fractions give a very critical indication of quality.—Chem. Drug., April 1892, 590.

——— Charles Rice, while acknowledging the theoretically interesting fractionation of salicylic acid by means of silver, doubts whether this process is practicable either for manufacturing purposes or for testing the commercial acid. Silver is much too expensive. As to the employment of the melting point as a test of purity in the Pharmacopœia, this is impracticable for the simple reason that reliable melting-point determinations can only be obtained by a thoroughly skilled chemist, and not by a moderately skilled pharmacist, especially where, as here, the difference in the melting points of pure acid and the contaminating acids is so slight.—Am. Drug., 1892, 165.

*Bismuth Salicylate--Preparation.*—H. Causse finds that sodium chloride, like ammonium chloride, opposes the dissociating action of water upon the salts of bismuth, and by substituting itself for the free acid contained in bismuth solution, it permits the complete neutralization of the acid. The author applies this peculiarity to the preparation of basic salicylate of bismuth. (Compare Proceedings 1891, xxxix., 599). Dissolve 35 gm. of oxide of bismuth in 40 c.c. of concentrated hydrochloric acid ; then add 500 c.c. of a saturated solution of common salt and neutralize with oxide or carbonate of bismuth. Into this solution filter 500 c.c. saturated solution of common salt, to which 9 gm. of soda, and 22 gm. of sodium salicylate have been added, when basic salicylate of bismuth is precipitated, $C_7H_5(BiO)N_3H_2O$. The violet mother liquors are decanted, and

the precipitate washed with water, acidulated with a few drops of nitric acid, until free from color. The salt occurs in microscopic prisms, it is decomposed by heat as well as by boiling alcohol. The constitution is probably:

$$C_6H_4 < \begin{matrix} COO-Bi < \begin{matrix} OH \\ OH \end{matrix} \\ OH \end{matrix}$$

—Pharm. Journ. Trans., Nov. 1891, 417, from Comptes rend., 1891, cxiii., 547.

*Bismuth Salicylate.*—According to Duyk this salt is best prepared as follows: 100 gm. of the subnitrate are treated for one or two days with one litre of water, to which 50 gm. of ammonia has been added. After shaking sufficiently the subnitrate is completely changed into an oxide, which is collected and carefully washed with water. This oxide, after expression, is heated, under constant stirring, with 25 gm. powdered salicylic acid on a water-bath. After the union has been effected, the salicylate is washed and dried at a gentle heat.—Am. Journ. Pharm., 1892, 76, from Bull. Soc. Pharm, Bruxelles, 1891. See also Nagelvoort in Pharm. Rundschau, 1892, 84.

*Bismuth Salicylate—Acid.*—J. W. England states that since a true acid salicylate is an impossibility, and the commercial acid bismuth salicylate is a mixture of varying proportions of normal salicylate and free salicylic acid, it would be better for the physicians to prescribe the normal salt, and add definite amounts of acid. He further gives the results of analyses of commercial salts: In making comparison it should be remembered that anhydrous normal bismuth salicylate ($BiOC_7H_5O_3$) should yield 64.46 per cent. of $Bi_2O_3$ on ignition. The yield of $Bi_2O_3$ of the samples examined was as follows: No. 1 (Foreign, acid), 27.2 per cent.; No. 2 (Domestic, basic), 66.3 per cent.; No. 3 (Acid), 43.4 per cent.; No. 4 (Foreign, basic), 67.4 per cent.; and No. 5 (Domestic, basic), 61.2 per cent.—Am. Journ. Pharm., 1891, 574.

*Salicyl-bromanilide, also called Antinervine.*—E. Ritsert has at various times examined this compound, and always found it composed of: 25 parts ammonium bromide, 25 parts salicylic acid, and 50 parts acetanilide. The mixture melts between 80 and 90° C.; after removing the salicylic acid and acetanilide with chloroform and evaporating, the residue was found to melt at 82–84° C.; mixtures made of salicylic acid and acetanilide in varying proportions always melted between 80 and 90° C. Incidentally, he found that acetanilide crystallizes from petroleum-ether in needles.—Am. Journ. Pharm., 1891, 408, from Pharm. Ztg., 1891, 393.

*Salicyl-bromanilide.*—H. Pruesse reports, as follows, on the variability of the melting-points of mixtures of salicylic acid and acetanilide: Acetanilide melts at 114° C., salicylic acid at 156° C., and antinervine (salicyl-

bromanilide) at about 80° C.—the lower figures denoting when melting began, and the higher when it was complete:

| | |
|---|---|
| One equivalent of salicylic acid with | |
| 1 equivalent of acetanilide | 82° C.–119° G. |
| ½ " " | 93° C.–141° C. |
| ¼ " " | 127° C.–148° C. |
| $\frac{1}{10}$ " " | 139° C.–150° C. |
| $\frac{1}{100}$ " " | 144° C.–154° C. |
| One equivalent of acetanilide with | |
| 1 equivalent of salicylic acid | 82° C.–119° C. |
| ½ " " " | 76° C.–86° C. |
| ¼ " " " | 88° C.–100° C. |
| $\frac{1}{10}$ " " " | 91° C.–104° C. |
| $\frac{1}{100}$ " " " | 107° C.–111° C. |

Antinervine is as nearly as possible represented by a mixture of 1 equivalent of acetanilide and a half of salicylic acid.—Chem. Drug., Dec. 1891, 883, from Pharm. Zeitg., 1891.

*Salicyl-bromanilide* is a combination introduced by Radlauer, which is said to contain bromacetanilide and salicylanilide, and to unite the desirable properties of acetanilide, bromine and salicylic acid. It is a white powder with an unpleasant, somewhat acidulous taste, sparingly soluble in cold water, easily soluble in boiling water, alcohol and ether; the dose varies from 0.2–0.3 gm.; it is used as an antinervine and antipyretic. For the sake of brevity it has been termed "salbromanilide."—Am. Journ. Pharm., July 1891, 345, from Pharm. Ztg., 1891, 323.

*Salicylic Acid—Reaction with Calcium Salts.*—G. Kottmeyer takes exception to a statement of Vortmann, that the aqueous solution of neutral salicylates does not produce a precipitate with chlorides of barium or calcium, not even on addition of ammonia, on heating to boiling, or on the addition of alcohol. Kottmeyer states, that on adding to a 20 per cent. solution of sodium salicylate a 25 per cent. solution of calcium chloride, and shaking, a heavy precipitate will be produced. A 10 per cent. solution of sodium salicylate does not precipitate a 10 per cent. solution of calcium chloride, either on shaking or on heating, but it precipitates on adding ammonia. Even a 1 per cent. solution of the sodium salt precipitates on adding a few drops of a concentrated solution of calcium chloride.—Pharm. Post, 1891, 753.

*Calcium Salicylate—Preparation.*—Sergiu Torjescu prepares it as follows: Dissolve 200 gm. of sodium salicylate in 5000 gm. of distilled water, filter, and add to the filtrate 10 gm. of soda solution (sp. gr. 1.160). 100 gm. of calcium carbonate are dissolved in an equivalent quantity of dilute acetic acid, so as to form a neutral solution, which is diluted with 2000 gm. of distilled water, and filtered directly into the salicylate solution. Collect

the precipitate on a filter, wash repeatedly with cold distilled water, and dry at a temperature not exceeding 35° C. Keep in well-stoppered containers. It forms a white, crystalline powder, without taste and odor, is soluble in 2000 parts of cold water, easier in carbonated water; in dilute acetic, nitric, and hydrochloric acids it is easily soluble.—Zeits. Oest. Apoth. Ver., 1891, 629.

*Sodium Salicylate—Cholagogue Properties.*—Germain Sée reports that he has found it to be most efficient of all cholagogues in promoting the expulsion of gall-stones; thus confirming the assertion of Rutherford.—Am. Journ. Pharm., Aug. 1891, 424, from London Lancet.

*Sodium Salicylate—Water of Crystallization.*—Helbing and Passmore find that the salt in crystals is practically anhydrous, the loss on drying at 104° C., being only 0.24 per cent. The formula of Ph. Brit. being $(NaC_7H_5O_3)_2H_2O$, requiring 5.3 per cent.—Chem. Drug., April 1892, 591.

*Sodium Salicylate.*—Solutions of sodium salicylate acquire after some time a brownish coloration which is due to the faintly alkaline reaction of the sodium salt. Ruecker recommends to add to the fresh solution 1 per mille of salicylic acid (of the weight of the sodium salt), which addition has been proposed several times before. If it is preferred to make this solution from salicylic acid and sodium bicarbonate, Ruecker gives the following proportions: 100 parts of salicylic acid, 61 parts of sodium bicarbonate, and 2320 or 1095 parts of cold distilled water, which will give a 5 per cent., respectively a 10 per cent., solution—Zeits. Oester. Apoth. Ver., 1892, 221.

*Sodium Salicylate—Purity of Commercial.*—J. C. Spenzer has examined 14 samples (10 American and 4 German) according to the requirements of the U. S. Ph., and at the same time criticized the officinal tests.

That of American manufacture does not answer all the pharmacopœial requirements, and is not as good as the foreign article. There was no indication of adulteration. The traces of impurities were undoubtedly derived from the materials used in its manufacture. Still the sale of the bulk article and paper box packages may be accountable to some extent for the acquirement of color through atmospheric influence.

It is difficult to find a sample which will not, particularly when closed for some time, be possessed of some odor.

This odor is rendered more prominent by heating in a dry, closed glass-stoppered bottle on a water-bath.

Certain corrections might be made in the pharmacopœial requirements, as: It should be soluble in less than or an equal weight of water, in from 5 to 6 parts of alcohol, and both of the solutions should be colorless. It should leave very nearly 33 per cent. of residue upon ignition to constant weight.

The acquirement of only a faint amber coloration when agitated with concentrated sulphuric acid.

An abridgment of the pharmacopœial requirements will be given here to show subsequently the fallacy of some of them.

Small white crystalline plates or a crystalline powder, permanent in the air, odorless, having a sweetish saline and mildly alkaline taste and a feebly acid reaction.

Soluble in 1.5 parts of water, in 6 parts of alcohol at 15° C. Ignited it leaves an alkaline residue amounting to between 30 and 31 per cent. of the original weight.

Agitated with concentrated sulphuric acid, should not impart color in fifteen minutes.

Filtered solution of 1 gm. in a mixture of 50 c.c. alcohol and 25 c.c. water acidulated with nitric acid should yield no precipitate nor become turbid when tested with barium chloride (absence of sulphates) or by silver nitrate (absence of chlorides).

1. By means of a Coddington lens or microscope, its structure can be determined.

2. *Color* is best distinguished by looking into a break in a mass.

Gray and pink preparations are still found. If the white color has a gray or yellow shade, Hager says it is due to an excess of soda, while if it has a pink or red tint, it is due to an excess of salicylic acid; also that the red or pink coloration is noticed sooner when phenol is present.

3. *Odor.*—(*a*) On opening a bottle closed for some time. (*b*) By heating some in a dry test-tube by placing it in a water-bath, not boiling. (*c*) Odor of the dry ether extract.

4. *Stability.*—Although Allen (Commerc. Org. Anal.) says that it is permanent in the air, he admits that it is liable to acquire color by keeping, especially if exposed to the air. According to Hager, this coloration is due to the influence of the carbonic acid gas and ammonia in the air. Even when well kept in a tightly stoppered bottle, it is difficult to keep it white for a time.

5. *Solubility.*—In water, is variously stated from less than an equal weight (Hager) to 1½ parts by weight (U. S. Ph.). In alcohol, from 5 or 6 (U. S. Ph.) to 8 parts (Allen).

6. *Reaction.*—Neutral or but slightly acid; use of blue and red litmus paper with the alcoholic and aqueous solutions, or by placing some of the dry salt on the moist paper according to E. Geissler.

7. *Taste.*—Dry salt and solution.

8. *Per cent. Residue.*—Ignition of a weighed quantity in a platinum crucible to a constant weight. The yield should not be less than 30 or over 32 per cent. (Hager); nearly 31.3 per cent. (Schmidt); 30 to 31 per cent. (Allen, U. S. Ph).

In no case was it found as low as in any of the above. If sodium salicylate be considered hydrous, as

| | |
|---|---|
| Salicylic Acid | 76.33 |
| Sodium Oxide | 18.34 |
| Water | 5.33 |

the theoretic amount would be 31.35 per cent., as

$$\underset{62}{Na_2O} : \underset{106}{Na_2CO_3} :: \underset{18.34}{Na_2O} : \underset{x}{Na_2CO_3} = 31.35 \text{ per cent.}$$

If taken as anhydrous, it would be 33.458 per cent., as

| | |
|---|---|
| Salicylic Acid | 80.63 |
| Sodium Oxide | 19.57 |

$$\underset{62}{Na_2O} : \underset{106}{Na_2CO_3} :: \underset{19.57}{Na_2O} : \underset{x}{Na_2CO_3} = 33.458 \text{ per cent.}$$

The writer thinks 33 per cent. of $Na_2CO_3$ to be nearly correct in the neutral article.

9. *Sugar.*—(*a*) Odor of burning sugar (caramel) on igniting. (*b*) Blackening when mixed with sulphuric acid. (*c*) Reduction of Fehling's solution after boiling with dilute sulphuric acid.

Some authorities state that pure sodium salicylate gives a reaction with Fehling's solution; this is erroneous, however, for beyond a changing of the blue color to a green (characteristic of salicylic acid) it causes no reduction.

10. *Phenol.*—Numerous methods were tried, but as yet a chemical test is wanting which will distinguish with certainty a contamination of sodium salicylate with phenol.

In support of this statement the following results are given:

(*a*) Extract slightly alkaline aqueous solution with stronger ether, evaporate the latter, gives a greasy deposit if phenol is present. The greasiness of the deposit or its odor can only be used to detect it. Since sodium salicylate is soluble in from 200 to 250 parts of ordinary and 500 parts of chemically pure ether, the residue, therefore, would contain sufficient salicylic acid to hinder or obscure the chemical reaction for phenol, as will be seen later.

(*b*) Rice's test, the officinal test of the Pharmacopœia for detecting carbolic acid in salicylic acid, is not reliable, as it gives a similar reaction for salicylic acid as it does for phenol.

(*c*) Almen proposes Lex's test, but the test gives with sodium salicylate free from phenol a light amber to a dark-brown coloration, which effectually masks the delicate pale blue on which the value of the test depends.

(*d*) Dragendorff's modification of Jacquemin's test is also faulty, as it gives a bluish-green coloration with the pure salt. Dragendorff has not proposed it as a test for phenol in salicylic acid, but it was used as a substitute for one which Muter has suggested, and with which it is practically identical.

(*e*) Solution of sodium salicylate poured upon the surface of a solution of potassium nitrite in sulphuric acid has proven unreliable, as the latter produces a greenish-blue cast with water alone. With sodium salicylate a carmine-red, easily diffused line of demarcation is produced which would conceal the green coloration.

(*f*) Sulphuric acid and sodium nitro-prusside, like phenol sodium salicylate, gave a rose-red line of demarcation; in all cases samples 1, 7, 8, 10, 12, and 13 gave a dirty greenish-yellow lower margin to the line.

(*g*) Sodium salicylate and nitric acid: 5 grains of sodium salicylate dissolved in ½ drachm of water, 7 drops ordinary nitric acid added, and let stand for some hours, when a yellow color is produced.

11. *Chlorides.*—Treatment of the dilute alcoholic solution, as directed in the Pharmacopœia, with silver nitrate.

12. *Sulphates.* - Treatment with barium chloride.

13. *Calcium Compounds.*—Treatment with ammonium oxalate.

14. *Foreign Organic Matter.*—Agitated with concentrated sulphuric acid, should not impart color in fifteen minutes. The production of a faint light yellow or light amber should be allowed, otherwise the test is valueless, as the best samples affect it that much under the conditions of the test.—Am. Drug., 1891, 282, from Proc. Ohio Pharm. Association.

*Sodium Salicylate—Solvent Power.*—Conrady states that solution of sodium salicylate possesses properties similar to "polysolve." By means of a concentrated solution many substances, otherwise quite insoluble in water, are rendered soluble; for instance menthol, thymol, volatile oils, etc. A solution containing 80 per cent. of carbolic acid does not act as a caustic: a clear mixture of equal parts of creasote and concentrated solution of sodium salicylate is easily made into a pill mass with powdered licorice root.—Sueddeut. Apoth.-Zeitg., 1892, 114.

*Salicyl-sulphonic Acid—Test for Albumen.*—See under *Albumen.* This acid is prepared by treating salicylic acid with anhydrous sulphuric acid in molecular proportions, taking enough of an excess of sulphuric acid to make up for what it may be short of being the absolute "anhydrous" acid. Its formula is best written as follows: $C_6H_3.HSO_3.OH.COOH$.—Am. Drug., July 1891, 223.

*Salophen—Acetyl-p-amidophenol.*—Salophen is a derivative of salol of the following constitution:

$$C_6H_4 \begin{array}{l} \diagup NHCOCH_3 \quad (1). \\ \diagdown OCOC_6H_4(OH) \quad (4). \end{array}$$

It is prepared by esterizing p-nitrophenol with salicylic acid, reducing the nitro-compound with tin and hydrochloric acid to an amido-group, and acetylize the latter. Salophen contains about 51 per cent. of salicylic acid, and appears in small, thin flakes, without odor or taste, and of a

neutral reaction. It is scarcely soluble in cold water, a little more in hot water, easily in alcohol and ether. It melts at 187°–188° C., and burns on platinum foil with a sooty flame. In the animal organism it splits into salicylic acid and acetyl-p-amidophenol; and it is stated to be a good remedy in articular rheumatism, the dose being 4 to 6 gm. during the 24 hours.—Pharm. Post, 1891, 1070, from Pharm. Zeitg., 1891, 678.

*Salol (Phenyl Salicylate)—Derivatives.—Phenyl acetylsalicylate (acetyl-salol); phenyl nitrosalicylate; phenyl acetylnitrosalicylate*, and others.—By W. Knebel.—Journ. Chem. Soc., Aug. 1891, 915, from J. pr. Ch. (2), xliii., 378–389.

*Salol—Caution.*—Several European physicians report fatal results following the administration of salol.—Am. Drug., July 1891, 216, from Lancet.

*Salol—Uses.*—Gonorrhœa is stated to be much more tractable to treatment with salol than without it. The main good is rendered by making the urine antiseptic and unirritating. A good formula is: Salol, 6 drams; copaiva, 1½ oz.; simple syrup, 3 oz.; mucilage of acacia, 3 oz.; tinct. of lavender comp. sufficient to make 8 oz. Mix. In tablespoonful doses.—Chem. and Drug., July 18, 1891, 78.

*Camphol.*—This is the name given to a syrupy liquid obtained by rubbing camphor and salol together, which Dr. A. Dallas claims to be of value in diphtheria, both externally and internally; also in rheumatism. The proportions of camphor and salol may be varied.—Western Druggist, 1892, 16, from Med. Standard.

——— A mixture of 30 parts of salol and 20 parts of powdered camphor are heated slowly until completely dissolved (without the intervention of either alcohol or water). After filtering, the solution is kept in well-stoppered, yellow bottles. It forms a colorless liquid of a greasy feel, insoluble in water, easily soluble in ether, chloroform and fixed oils, which is easily decomposed on exposure to air and light.—Pharm. Post, 1891, 1009, from Sem. Med.

*Salol—Preparation.*—Wierp and Ernert have recently noticed that if salicylic acid be heated to between 160–240° C., it forms salol by loss of water and carbon dioxide, if precautions are taken to remove the water as liberated and to prevent the access of air. The salol is purified by washing with water, or, if necessary, with soda solution, and then by crystallization from alcohol or other suitable solvent.—Am. Jour. Pharm., 1892, 142, from Pharm. Centralh., 1892, 27.

*Salol—Reaction.*—When a small quantity of salol is added to a few drops of nitrosulphuric acid, the mixture is colored yellow, changing to brown and green on being stirred with a glass rod. On dilution with about 50 c.c. of water the liquid assumes a rose color, the green color reappearing on adding ammonia. Resorcin gives under the same circum-

stances a deep-blue color changing to red, ammonia causing the blue color to reappear.—Am. Jour. Pharm., 1892, 77, from Jour. Pharm. d'Anvers.

*Salol—Formulas.*—E. Egasse and Dujardin-Beaumetz give several formulas for the exhibition of salol, for which reference must be had to Am. Jour. Pharm., 1892, 28, 29, from Bull. de Thérap.

*Salol—Detection in Urine.*—See under *Urine.*

*Shikimic Acid—Chemistry.* - J. F. Eykman from his investigations draws the conclusion that shikimic acid, $C_7H_{10}O_5$, must be a trihydroxy-tetrahydrobenzoic acid, $C_6H_6(OH)_3.COOH$. The author also studied *quinic acid,* $C_7H_{12}O_6$, and *quinide,* $C_7H_{10}O_5$, and regards the constitution of quinic acid as being probably represented by one of the following formulæ:

$$OH.CH{<}{\begin{matrix}CH(OH).CH_2\\CH_2.CH(OH)\end{matrix}}{>}C(OH).COOH, \text{ or}$$

$$OH.CH{<}{\begin{matrix}CH(OH).CH(OH)\\CH_2\text{———}CH_2\end{matrix}}{>}C(OH).COOH.$$

—Jour. Chem. Soc., Aug. 1891, 919, from Ber., xxiv., 1278–1303.

*Succinic Acid—Substitution Products.*—C. A. Bischoff gives a list of substitution products, together with their melting points, from which we learn that the monosubstitution derivatives all melt at 91–114° C., the symmetrical di-derivatives at 115–138° C., the asymmetrical dimethyl and all tri-derivatives at 139–141° C., the parasymmetrical di-derivatives at 154–197° C., and tetramethylsuccinic acid at 200° C. The author also gives his theoretical results of studies of the succinic acid group.—Jour. Chem. Soc., Aug. 1891, 891–892; from Ber., xxiv., 1064–1095.

*Mercury Succinimide.*—Vollert recommends this salt as the most suitable for hypodermic injections, since it causes no pain whatever, may be combined with cocaine without interfering with the effects of either constituent. If the quantity of cocaine is, however, notably exceeding that of the mercury salt—say 3 to 1—a resinous compound, produced by the reaction between the substances is separated.

Succinimide has the composition $CH_2CO.NH.CH_2CO + H_2O$. It is usually prepared by very rapidly distilling ammonium succinate. It is a crystalline solid, very soluble in water, also in alcohol. The hydrogen of the NH group may be replaced by metals. Thus, the mercury salt is obtained when an alcoholic solution of succinimide, mixed with a few drops of ammonia, is added to an ethereal solution of mercuric chloride.—Am. Drug., 1891, 317.

*Tannin—Estimation.*—A. Moullade estimates tannin by means of iodine. His method, which may be considered an improvement on Jean's iodine method (see Proceedings, 1877, xxv. 296), is as follows: The iodine solution contains 5.20 gm. of iodine and 7.6 gm. of potassium iodide per litre; this is standardized by means of a freshly prepared solu-

tion of pure and dry tannin, 1 : 1000; a 10-per cent. solution of sodium bicarbonate is also required. Ten c.c. of the tannin solution, about 20 c.c. of the sodium bicarbonate solution, 10 c.c. of water, and 2 to 3 c.c. of carbon bisulphide are placed in a flask, and the iodine solution run in until a violet or rose tint is imparted to the bisulphide. A second assay is made with a little less iodine solution run in at once, and this is repeated with slightly varying quantities of iodine until the exact titre for 10 c.c. of the tannin solution is found. Astringent solutions are estimated in this way, a second assay being made with the tannin removed by treatment with hide. With wines, the assay is first made with 10 c.c. of the wine, then 50 c.c. of the wine are treated with 50 c.c. of a solution of gelatin (1 : 1000), and 20 c.c. of the filtrate taken for a new assay. In both cases the difference in the amount of iodine required, indicates the amount of tannin.—Year-book Pharm., 1891, 132, from Journ. Pharm. Chim. xxii., 153–159.

*Tannin—Estimation in Barks, etc., by Gelatin.*—S. J. Hinsdale gives the following hints for the approximate estimation of tannin:

Exhaust 5 grams of the ground dry bark with boiling water, and make the decoction up to 250 c.cm. with water. Mix in a beaker glass 50 c.cm. of the dilution (equal to 1 gram bark), with 25 c.cm. of a solution composed of 1.5 grams clear dry gelatin, 6 grams alum, and 500 c. cm. water (too much gelatin is objectionable, just about enough to fully precipitate the tannin should be used; 25 c. cm. of the solution—equal to 0.075 gram gelatin—is about right for 1 gram bark holding from 5 to 8 per cent. of tannin). Filter on a weighed 10 cm. filter, and without washing on the funnel fold the filter and precipitate in a piece of thick blotting paper—securing it with a thread—and place it in a vessel of water of temperature about 120° F. to wash. Allow it to remain in the water for 8 or 10 minutes, then take it out and place it in an inclined position to drain, then put the filter on a piece of thick blotting paper and dry at 212° F. Weigh and reckon 56 per cent. of the precipitate as tannin.—Pharm. Record, 1891, xii, 101, from Rep. N. C. Pharm. Association.

*Tannin—Estimation in Astringents.*—Giulio Morpurgo estimates tannin by the specific gravity of its solutions. The finely powdered substances are boiled repeatedly with water, the decoctions mixed, allowed to cool, brought to a definite volume, and filtered. By means of a very accurate areometer which gives the specific gravity to the fourth decimal, the liquid is examined at 15° C. Next, the liquid is heated to boiling, and gradually added well washed, dry and finely powdered lead carbonate, until a drop of the clear liquid ceases to react with ferric chloride. After cooling, the liquid is brought to its former volume, filtered, and the specific gravity taken as before. The percentage of tannin is calculated according to the following table, and the difference between the two percentages is tannin. The first percentage is tannin plus other substances, the second percentage

indicates only these "other substances," tannin having been precipitated by the lead carbonate.

| Specific gravity. | Percentage. | Specific gravity. | Percentage. |
|---|---|---|---|
| 1.001 | 0.25 | 1.016 | 4.00 |
| 1.002 | 0.50 | 1.019 | 4.75 |
| 1.003 | 0.75 | 1.020 | 5.00 |
| 1.004 | 1.00 | 1.024 | 6.00 |
| 1.006 | 1.50 | 1.028 | 7.00 |
| 1.008 | 2.00 | 1.0365 | 8.00 |
| 1.012 | 3.00 | 1.0405 | 9.00 |
| 1.014 | 3.50 | 1.0445 | 10.00 |
| | | 1.062 | 15.00 |

In order to get reliable results it will be necessary to guard against excess of lead carbonate, since, after the precipitation of tannin, other substances will be precipitated.—Chem. Zeitg., Rep., 1892, 154, from Zeits. Nahr. Unters. Hygiene, 1892, 145.

*Tannic Acid—Extraction.*—A patent has been granted the firm of J. D. Riedel, of Berlin, for the following method: The properly comminuted and, if necessary, dried material is placed in a suitable continuous extraction apparatus and exhausted with a solvent for resins, waxes, fats and chlorophyll-like ether, carbon disulphide, amyl alcohol, benzol, benzin, etc.; by heating the solvent is completely removed from the material and the tannin then extracted by percolation with water; by dialysis the crystallizable salts and gallic acid are removed as rapidly as possible from the percolate to prevent change in the tannin, and then the dialyzed solution is evaporated. The substances found in most tanning material may be divided into four groups: (1) resin, wax, fatty substances, chlorophyll; (2) Tannic and gallic acids; (3) Substances soluble in water, chiefly organic salts, sugar, extractive matter; (4) vegetable fibre. The methods hitherto used extract either the first two groups, to be separated later, or extract all water-soluble substances, so that the finally produced tannins are more or less impure. J. D. Riedel uses first a solvent which removes the substances belonging to group (1), but does not dissolve the tannins; the next step is to extract with water, and free the tannin from the gallic acid and other crystallizable substances by dialysis.—Am. Jour. Pharm., 1891, 462, from Pharm. Centralh., 1891, 419.

*Tannic Acid—Reaction.*—Baemes uses a solution containing in 10 c.c. 1 gm. of sodium tungstate and 2 gm. of sodium acetate, which yield with tannin in acid or alkaline solution a straw-colored precipitate, insoluble in water.—Am. Journ. Pharm., 1892, 77, from Monit. Pharm., 1891, 1006.

*Tannic and Gallic Acids—Distinctions.*—J. Napier Spence has subjected the different tests proposed to a critical examination, and comes to the following results:

Guyard's test is based on the different solubility of the respective precipitates with acetate of lead in acetic acid, the lead gallate being soluble and the tannate quite insoluble. According to Spence the difference is too small to be of any use.

Lead nitrate produces no precipitate with gallic acid, but it does with tannic acid; this precipitate, however, is soluble in gallic acid. In a mixture of both acids a permanent precipitate will be produced only when tannic acid is in excess, and only this excess will be precipitated. The same is the case with alkaloids, gelatin and starch, the tannates of which are soluble in gallic acid.

Ostermeyer's modification of Wagner, based on the precipitate produced by cinchonine, using fuchsin as indicator, is unreliable because tannate of cinchonine is soluble in excess of gallic acid, and fuchsin is precipitated both by tannic and gallic acids.

Ammoniacal solutions of copper and nickel sulphates precipitate only tannic acid, and this test appears to be reliable.

Young's test with potassium cyanide (see Proceedings 1884, xxxii., 300) is quite satisfactory. With gallic acid a carmine-red coloration is produced, but none with tannic acid; the presence of the latter acid will merely modify the shade, making it more yellowish, according to the quantity present. An approximate determination of both acids may be obtained by comparing the coloration produced with that of a solution containing known quantities of both acids and potassium cyanide.

According to Gerland, tartar emetic precipitates only solutions of tannic acid in the presence of ammonium chloride. Spence, however, finds that this holds good only for diluted solutions of gallic acid; concentrated solutions of this acid are precipitated by tartar emetic even in the presence of ammonium chloride.

Guenez' method of titrating with tartar emetic in presence of "Poirier's green, 4JE," Spence found unreliable too, inasmuch as in a mixture of both acids only the excess of tannic acid will be indicated.—Zeits. analyt. Chem., 1892, 87, from Journ. Soc. Chem. Ind., 1891, 1114.

*Tannic Acid—Transformation into Benzoic Acid.*—See under *Gallic Acid.*

*Benzoyl Tannin.*—If a dilute cold aqueous solution of tannin is treated with 5 c.c. of strong soda lye with the addition of benzoyl chloride, there is a reaction on stirring. The liquid, at first turbid, becomes dark, then red, and finally clear; a viscous matter being precipitated, which solidifies into small white globules. This mixture, on treatment with ether, gives a pasty mass. When taken up in water, the substance hardens and yields, when dried, a light yellow powder, insoluble in water and boiling alcohol. It is soluble in aniline, dimethylaniline, phenylhydrazine, and slowly in hot soda lye.—Dr. Carl Böttinger, Moniteur Quesneville, 1891, No. 584, through Chem. News, July 17, 1891, 38.

*Plumbum Tannicum.—German Unoff. Formulary.*—Pour 30 parts of solution of subacetate of lead, under constant stirring, into a cold solution of 10 parts of tannic acid in 180 parts of water. Collect the precipitate upon a filter, wash, and dry it at a gentle heat, not exceeding 30° C.—Am. Drug., 1892, 60.

*Plumbum Tannicum Pultiforme (Pasty Tannate of Lead)—German Unoff. Formulary.*—Boil 8 parts of cut or bruised oak bark with sufficient water for half an hour, so as to make, after straining, 40 parts. Filter this, and add to the filtrate solution of subacetate of lead as long as a precipitate is produced. Collect this on a filter, transfer the still moist mass to a glass vessel, and mix with 1 part of alcohol.—Am. Drug., 1892, 60.

*Tannin, detection* in *wine*, see *Wines* (Vitaceæ).

*Tannin, detection* in *urine*, see *Urine.*

*Tariric Acid.*—Arnaud has found a peculiar fatty acid in the oily seeds of a Guatemalan Picramia. The formula is $C_{18}H_{32}O_2$; it fuses at 50° C., and crystallizes in nacreous crystals from the ethereal solution. Arnaud names this acid "tariric acid." The seeds contain 67 per cent. of fat.—Pharm. Zeitg., 1892, 238, from Comptes rendus, xciv., 74.

*Tartaric Acid—Constitution of Aqueous Solutions.*—Aignan.-Journ. Chem. Soc., Sept. 1891, 1018, from Comptes rendus, cxii., 951–953.

*Tartaric Acid—Synthesis.*—Genvresse synthesizes tartaric acid by the action of nascent hydrogen upon glyoxalic acid ($CHO.CO_2H$)—action of acetic acid upon zinc-dust in the presence of glyoxalic acid. Two molecules of the latter acid are joined together by two hydrogen atoms, giving racemic acid (inactive tartaric acid). This synthesis would appear to throw some light upon the natural formation of tartaric acid; for remembering the close relationship between glyoxalic and oxalic acids, which latter is one of the most readily formed in vegetable tissues, and the reducing agents which appear to be connected with chlorophyll, we have all means at hand to account for the natural synthesis of tartaric acid.—Chem. Drug., March 1892, 440.

*Uric Acid.* See under *Urine.*

*Valerianic Acid—Iron Salt.* See under *Ferrum.*

## Organic Bases.

### ALKALOIDS.

*Alkaloids and Vegetable Bases—History and Nature.*—The Am. Drug. (1891, 320–321) contains a highly interesting abstract from the introduction of a work by by A. Pictet, which we regret we cannot quote in full. The following paragraphs, however, may find a place here:

It is only about fifteen years since the veil resting upon their constitution began to lift. The discovery and study of the pyridine and chinoline

method of procedure is to dissolve the alkaloid in ether, chloroform or other immiscible solvent. Next place the solution in a stoppered cylinder with water colored with methyl-orange. On running in the standard acid with constant agitation, the end reaction is readily observed, the red color presenting a marked contrast to the coloring matter of the immiscible layer. The following table contains all the available information on that subject. In the column headed "methyl-orange" the word "alkaline" is printed in italics where accurate titration can be made:

| Substance. | Formula. | Methyl-orange. | Phenolphthalein. | Litmus. |
|---|---|---|---|---|
| Methylamine | $CH_5N$. | *Alkaline.* | — | Alkaline. |
| Trimethylamine | $C_3H_9N$. | *Alkaline.* | — | Alkaline. |
| Aniline. | $C_6H_7N$. | Alkaline. | Neutral. | Neutral. |
| Pyridine | $C_5H_5N$. | *Alkaline.* | Neutral. | Alkaline. |
| Quinoline | $C_9H_7N$. | *Alkaline.* | — | — |
| Antipyrine | $C_{11}H_{12}N_2O$. | *Alkaline.* | Neutral. | Neutral. |
| Coniine | $C_8H_{17}N$. | *Alkaline.* | Alkaline. | Alkaline. |
| Nicotine | $C_{10}H_{14}N_2$. | *Alkaline.* | Alkaline. | Alkaline. |
| Aconitine | $C_{33}H_{45}NO_{12}$ | *Alkaline.* | Neutral. | Alkaline. |
| Atropine | $C_{17}H_{23}NO_3$. | *Alkaline.* | Alkaline. | Alkaline. |
| Cocaine | $C_{17}H_{21}NO_4$. | *Alkaline.* | Neutral. | Alkaline. |
| Morphine | $C_{17}H_{19}NO_3$. | *Alkaline.* | Faintly acid. | Alkaline. |
| Codeine | $C_{18}H_{21}NO_3$. | *Alkaline.* | Alkaline. | Alkaline. |
| Narcotine | $C_{22}H_{23}NO_7$. | — | — | — |
| Strychnine | $C_{21}H_{22}N_2O_2$ | *Alkaline.* | Neutral. | Alkaline. |
| Brucine | $C_{23}H_{26}N_2O_4$ | *Alkaline.* | Neutral. | Alkaline. |
| Cinchona bases | — | — | — | Alkaline. |
| Caffeine | $C_8H_{10}N_4O_2$. | — | — | — |
| Urea | $CH_4N_2O$. | Neutral. | Neutral. | Neutral. |

—Chem. Drug., Jan. 1892, 104.

*Color Reactions of Alkaloids.*—A. H. Allen, in the second part of the volume of "Commercial Organic Analysis," has an interesting chapter on the color reagents and their reactions with the alkaloids.

*Alkaloids—Reactions.*—Alfred Dohme communicates a series of reactions for alkaloids used in the pharmaceutical laboratory of the University of Strassburg, all of which have been tested by F. A. Flueckiger himself, and several of which are new. Considering that they are thoroughly reliable, it has been thought advisable to reprint them in extenso. The general remarks will be found here; for particulars, reference must be had to the respective alkaloids.

Reagents used will be designated throughout by Roman numerals, as follows:

I. Ammonia water, spec. grav., 0.96 at 15° C.

II. Lime water, saturated at 15° C.

III. Sodium Hydroxide, solution of 1.17 sp. grav.

IV. Solution of iodine in water, saturated.

V. Solution containing iodine, 1; potassium iodide, 8; water, 1180 parts.

VI. Bromine water, bromine, 1; water, 30 parts.

VII. Mercurio-potassium iodide,

$$\text{Containing} \left\{ \begin{array}{ll} HgI_2 45.4 \text{ gms.} \\ KI \quad 33.2 \quad " \end{array} \right\} \text{in one liter.}$$

VIII. Mercurio-potassium bromide,

$$\text{Containing} \left\{ \begin{array}{ll} HgBr_2 36.0 \text{ gms.} \\ KBr \quad 26.6 \quad " \end{array} \right\} \text{in one liter.}$$

IX. Mercuric chloride, 1 part; water, 19 parts.

X. Mercuric cyanide, saturated solution.

XI. Potassium ferricyanide, 1 part; water, 19 parts.

XII. Potassium ferrocyanide, 1 part; water, 19 parts.

XIII. Sulphuric acid, spec. grav., 1.840.

XIV. Hydrochloric acid, spec. grav., 1.124.

XV. Nitric acid, spec. grav., 1.153.

XVI. Potassium bichromate, 1 part; water, 19 parts.

XVII. Picric acid, saturated aqueous solution.

XVIII. Tannic acid, 1 part, water 19 parts.

XIX. Sulphuric acid,

$$\text{Containing chromic acid,} \left\{ \begin{array}{ll} K_2Cr_2O_7 & — 0.02 \\ H_2O & — 10.00 \\ H_2SO_4 & — 30.00 \end{array} \right\} \text{parts.}$$

XX. Sulphuric acid,

$$\text{Containing permanganic acid,} \left\{ \begin{array}{ll} K\,Mn_4O & — 0.02 \\ H_2O & — 10.00 \\ H_2SO_4 & — 30.00 \end{array} \right\} \text{parts.}$$

XXI. Ferric chloride 1 part, water 19 parts.

List of alkaloids, etc., examined: Acetanilide, antipyrin, atropine, berberine, brucine, caffeine, cinchonine, cinchonidine, cocaine, codeine, colchicine, coniine, homatropine, morphine, narceine, narcotine, nicotine, quinine, quinidine, strychnine, and veratrine.—Pharm. Review, 1892, 6, 26, 47, and 64.

*Alkaloids—Estimation by Kjeldahl's Iodometric Method.*—This method, proposed by A. Christensen (see Proceedings 1891, xxxix., 609), according to A. Dohme, gives very reliable results with pure alkaloids and their salts, but is not suited for the estimation of drugs or their preparations, especially on account of the color, which renders it difficult to determine the end-reaction. A. Christensen proposes to obviate this by adding a layer of benzin (benzol ?), and take up the iodine in this, and then titrate until

this layer becomes decolorized. Unfortunately the benzin has a decided tendency to take up other things than the iodine, and especially coloring matter, so that it is nearly impossible to settle upon an end-reaction by this method.—Pharm. Review, 1892, 83.

*Alkaloids.*—C. J. H. Warden (see Proceedings 1891, xxxix, 607) recommended to employ the precipitates produced by the addition of Mayer's reágent; being insoluble in the acid fluids of the stomach they will not be absorbed before they have passed into the intestines. It must not be forgotten, however, that at the same time a certain quantity of mercuric iodide will be administered.—Pharm. Centralh., 1892, 149.

*Alkaloids—Reagent.*—A. J. Ferreira da Silva has found that Lafon's ammonium selenite test for morphine and codeine (see Proceedings 1886, xxxiv., 600,) is much more applicable. The author has studied the reagent in its reactions with other alkaloids, placing small portions of the alkaloids in his experiments upon watch-glasses set upon white paper. The following is the table he has prepared:

Atropine. No coloration.

Aconitine. No immediate coloration: after 20 minutes, a very slight rose color.

Berberine. Greenish yellow, becoming successively very brown rose at the margins and violet in the middle; half an hour afterwards entirely vinous red, which lasts for three hours.

Brucine. Reddish or rose color, becoming pale orange; half an hour after, an amber color, and no deposit.

Caffeine. No distinct coloration. At the end of three hours, the liquid was reddish, and there appeared a slight deposit.

Cinchonine. Nothing.

Cinchonidine. Nothing.

Cocaine. After half an hour, no decided coloration or precipitate. After three hours, the same reaction as caffeine.

Curarine. Slight violet coloration: after some time reddish. No red deposit at the end of three hours.

Delphine. Slightly reddish coloration, passing into a violet red. No ppt. at the end of three hours.

Digitalin. No immediate color. Yellowish after half an hour. After three hours a reddish deposit.

Eserine. Lemon yellow color, turning to orange. Three hours afterwards the color was paler.

Morphine. Bright greenish blue; half an hour after, maroon yellow and no deposit. After three hours, the liquid maroon brown, no red deposit.

Narcotine. Bluish color, becoming violet and then reddish. After half an hour a fine reddish color and no ppt. After three hours a small red deposit.

Narceine. Yellow-green color, becoming brownish, and after half an hour reddish. Afterwards a red deposit, which is very distinct in two or three hours.

Papaverine. Bluish color; the liquid becoming bottle-green, dirty yellowish green, violet blue, then red. A small bluish deposit.

Pilocarpine. Nothing.

Solanine. Canary yellow, and then brownish. After half an hour, a rose colored ring, and after three hours, the liquid becomes violet red.

Saponin. Yellowish, becoming slightly reddish. (Reaction not distinct.)
Senegin. Light, dirty yellow. After three hours, liquid reddish.
Veratrine. Indistinct yellowish color, sometimes with a green tone. After half an hour yellow. After three hours, deposit red and liquid yellowish. (Reaction indistinct.)

—Am. Journ. Pharm., 1891, 503, from Comptes rendus, cxii., 1266.

*Alkaloids—Ferrocyanides.*—H. Beckurts has prepared ferrocyanides of several alkaloids by precipitating alkaloidal salts with potassium ferrocyanide, and according to whether the precipitation takes place in neutral or acid solutions, the resulting alkaloidal ferrocyanide is either normal or acid.

*Atropine* salt, amorphous. *Quinine* salt, greenish, amorphous. *Quinidine* salt, yellowish-white, crystalline. *Cinchonine* salt, orange yellow, crystalline. *Cinchonidine* salt, reddish-yellow, crystalline. *Cocaine* salt, white, amorphous. *Coniine* salt, white, amorphous. *Hydrastine* salt, white, amorphous. *Morphine* salt, white, crystalline, becomes pale blue in the air. *Narceine* salt, bluish-white, crystalline. *Narcotine*, bluish-white, voluminous. *Pilocarpine* salt, white, crystalline. *Sparteine* salt, white, crystalline. *Strychnine* salt, white, crystalline, with a bluish shade; decomposed by hot water with separation of hydrogen ferrocyanide. *Brucine* salt, white, crystalline, turns quickly blue in the air; dilute solutions deposit large white prisms. The morphine, narcotine, pilocarpine and sparteine salts are easily soluble in water; the remainder only sparingly so. —Yearbook Pharm., 1891, 33, from Archiv, ccxxviii., 347–352.

*Proximate Principles and Derivatives.*—A description and a consideration of the chemical and pharmacological properties so far as is known of the following: Arecoline hydrobromate, caffeine ferro-valerianate, caffeine phosphate, caffeine succinate, canadine, cocaine nitrate, corydaline hydrochlorate, cystisine hydrochlorate, digitonin, duboisine hydrobromate, euxanthon, guaranine tri-iodide, morphine stearate, narceine salicylate, protocotoin, quinine ferro-hydrocyanate, quinine ferri-hydrocyanate, quinine and iron peptonate, sparteine tri-iodide, theobromine and lithium salicylate.—Merck's Bull., 1892, 281, 282.

*New Proximate Principles from Javanese Medicinal Plants.*—By M. Greshoff (Berichte xxiii., 3537; selection in Amer. Drug.)—Pharm. Era, Oct., 1891, 237.

*Christensen's Method for Determination of Alkaloids and their Molecular Weights.*—By Alfred Dohme (Chem. Zeitung, 1890, 14, No. 80).—Pharm. Review, 1892, 83, 84.

*Atropine and Morphine—The Antagonism of.*—By H. Unverricht (CKl. 12, 849–52, Dorpat).—Chem. Central-Blatt, 1892, 541.

*Atropine and Morphine.*—By H. Unverricht. (CKl. 13, 49–52. 24.1). —Chem Central-Blatt, 1892, 541, 542.

*Atropine and Morphine—The Antagonism of.*—By C. Binz. (CKl. 12,

969–72, Bonn). A reply to H. Unverricht.—Chem. Central-Blatt, 1892, 541.

*Supplementary Work on ψ-Tropine.*—C. Liebermann has examined the products of the oxidation of pseudotropine. The main product is tropic acid. Ecgoninic acid is also obtained.—Berichte, 24, 2587.

*Tropine.*—By G. Merling (Ber., 24, 3108–3126). The experiments described in this abstract, taken in conjunction with the facts already known, prove that neither the formula proposed by the author, nor that of Ladenburg, which Liebermann has already shown to be untenable (Abstr., 1891, 749), represents the constitution of this compound.—Jour. Chem. Soc., 1892, 358–360.

*Estimation of Free Alkaloids and Their Molecular Weight.*—By A. Christensen (Chem. Zeit., 14, 1346–1352). Since Kjeldahl has called attention to the iodometric estimation of acids and alkalies as being particularly suitable for the determination of ammonia, the author has successfully applied the process to alkaloids.—Abstr. in Jour. Chem. Soc., 1892, 666, 667.

*A Simple Method for the Determination of Alkaloids in Narcotic Extracts.*—By O. Schweissinger and G. Sarnow (Pharm. Centralh., xxxi, 1890, 771–775).—Berichte, 1891, 24, 96, 97.

*Tropine.*—By A. Ladenburg (Ber., 24, 1628–1633). The first part of this paper contains crystallographic descriptions and measurements of tropine platinochloride and tropine aurochloride.—Jour. of Chem. Soc., 1891, 1121.

*Tropine.*—By G. Merling (Ber., 1891, 24, 3108–3126).

*Nitro-atropine.*—By Alfred Einhorn and Louis Fischer.—Berichte, 1892, 25, 1390, 1391.

*The Action of Hypochlorous Acid upon Tropine.*—By Alfred Einhorn and Louis Fischer.—Berichte, 1892, 25, 1391–1394.

*Pseudoconhydrine.*—(Berichte von E. Merck in Darmstadt, 1892).—Jour. Pharm. Chim., 1892, 250, 251.

*Quinaldine—Explanation of Synthesis.*—By W. v. Miller.—Jour. Chem. Soc., Sept. 1891, 1101, from Ber., xxiv., 1720–1728.

*Quinoline Derivatives—Oxidation.*—By W. v. Miller.—Jour. Chem. Soc., Sept. 1891, 1094–1097, from Ber., xxix., 1900–1922.

*Chinoline.*—E. Noelting and Ch. Schwartz call the radical of chinoline, $C_9H_6N$, "chinyl."—Chem. Zeitg. (Rep.), July 1891, 186.

*Chinoline—New Derivative.*—G. N. Vis has patened a derivative of chinoline, which is stated to be antipyretic and anti-neuralgic. It is obtained by treating ortho-oxichinolinethylether with nitric or nitro-sulphuric acid, and reducing the formed mononitro-ether by the action of tin and

hydrochloric acid; the acetate is the new antipyretic, for which, as yet, no handy name has been proposed. The chemical name is "ortho-oxethyl-anamono-acetylamidochinolin," it fuses at 155° C., and is soluble in cold water, more easily in hot water, alcohol and diluted acids.—Zeits. Oester. Apoth. Ver., 1891, 429, from Pharm., Centralh., 1891, 433.

*Hydrochinone.*—Although an excellent developer (in photography), its limited solubility in water is a drawback. James H. Stebbins, Jr., endeavored to overcome it by acting upon hydrochinone with sulphuric acid, and forming a sulpho acid. For particulars see Chem. News, 1891, lxiv., 69, from Jour. Am. Chem. Soc., xiii., 155.

*Muawine.*—E. Merck isolated this alkaloid from the bark of the Muawi tree (not determined). The bark possesses toxic properties similar to those of sassy bark (Erythrophlœum guineense), only acting stronger and quicker. The alkaloid is thick, syrupy, easily soluble in alcohol, ether and chloroform, and resembles erythrophlœine. The salts do not crystallize, the bromhydrate forming a white powder easily soluble in water, alcohol and chloroform. According to Kobert, the physiological action is similar to, but not identical with, that of erythrophlœine.—Am. Jour. Pharm., July 1891, 339.

*Pyridine—Synthesis.*—Explanation of Hantzsch's synthesis by C. Beyer.—Journ. Chem. Soc., Sept. 1891, 1090, from Ber., xxiv., 1662–1670.

*Piperidine and Oxypyridine Bases.*—By A. Ladenburg. — Journ. Chem. Soc., Sept. 1891, 1092, from Ber., xxiv., 1619–1628.

*Synthesis of Pyridine Derivatives from Deriviatives of α-Pyrone.*—By M. Gutzeit and O. Dressel. The authors discuss the mechanism of the reactions, and arrive at the conclusion that the pyrone derivative first combines with the elements of ammonia to form an intermediate product, which is then converted into a pyridine derivative by the elimination of 1 mol. $H_2O$.—Journ. Chem. Soc., Aug. 1891, 939, from Annalen, cclxii., 89–132.

*Quinethyline—A Base Homologous to Quinine.*—E. Grimaux and A. Arnaud give the generic name of Quinines to compounds of the general formula, $C_{11}H_{21}N_2O,OR$, R standing for an alkyl-radicle. The authors name the ordinary quinine "quinomethyline," and a homologous compound "quinethyline," $C_{19}H_{21}N_2O,OC_2H_5$ or $C_{21}H_{26}N_2O_2$ has been obtained by ethylating cuprein. Quinethyline is white, amorphous, melts at 160° C., and is soluble in ether, alcohol and chloroform; dissolved in diluted sulphuric acid it fluoresces.—Chem. News, July 1891, 12, from Comptes rendus, 1891, cxii.

*Betaines of Pyridine Bases.*—There are four methods of obtaining betaines: (1) Hoffmann's, by the action of ethyl chloracetate on the tertiary base, producing the chloride of the alkyl betaine; (2) Liebreich's, by the action of chloracetic acid on the tertiary base at a raised temperature,

producing the betaine hydrochloride; (3) Griess', by the action of methyl iodide and an alkali on the amido-acid in methyl alcohol, producing the alkaline iodide of the betaine; (4) Kraut's, by the action of an alkyl iodide on the silver amido-salt, producing the iodide of the alkyl betaine. M. Krueger describes *pyridinebetaine*, *picolinebetaine* and *piperidinebetaine*, with their salts and compounds.—Jour. Chem. Soc., Aug. 1891, 941; from J. prakt. Ch. (2), xliii., 271–303, and 364–377.

*Cadaverine, and the Treatment of Cholera.*—Cadaverine, $C_5H_{14}N_2$, which was first isolated from the human corpse by Brieger, has subsequently been detected in the urine of patients suffering from cystinuria, and occurs among the products of cultivations of the cholera bacillus. R. Kobert thinks that the danger of this compound to human patients may be considerably lessened by its conversion into a neutral salt. He therefore favors the treatment of cholera by the administration of acid drinks and washing the intestines with acid liquids.—Yearbook Pharm., 1891, 249; from Pharm. Centralh., 1891, 162.

*Ptomaines.*—According to O. de Coninck, the ptomaine $C_{10}H_{15}N$ is a viscous, yellowish liquid with an agreeable odor; it is heavier than, and only slightly soluble in, water, but dissolves readily in ether, absolute alcohol, acetone, and light petroleum. After being dried over fused potassa, it boils at about 230° C. with partial decomposition. The hydrochloride forms yellowish needles, which are highly deliquescent, and very soluble in water. In the presence of a very small quantity of air, the crystals acquire a rose color; with a large quantity of air they become brown, and form a resinous product.—Yearbook Pharm., 1891, 64; from Comptes rendus, cx., 1339–1341.

*Choline—Transformation into Neurine.*—Choline or trimethyl-oxethyl-ammonium hydroxide has recently been found in a large number of substances both of animal and vegetable origin, but especially the latter. It is regarded as in part a split product of the easily decomposable leucithin or protagon. C. Gram claims to have proved that the comparatively harmless choline is more or less completely transformed by a series of agents into neurine, which is a strong poison. If he is correct in this, an explanation is furnished of the fact that certain vegetable and animal materials, when ingested, may produce, apparently without any external cause, a toxic effect to which, under normal relations, they never gave rise. E. Schmidt has followed up the suggestion of Brieger that neurine originates as a product of putrefaction under the influence of micro-organisms. On subjecting choline or choline hydrochloride to the action of micro-organisms, for instance, in an infusion of hay, he found indications of the presence of neurine. The neurine compound was not isolated in sufficient quantity for the purpose of exact analysis, yet observations of its form, melting point, solubility, and especially of its physiological effects, led to the con-

clusion that a small proportion of choline is transformed into neurine under the influence of putrefaction. Schmidt feels justified in assuming that choline at the moment of its separation from the leucithines, which are so widely diffused throughout the animal and vegetable kingdoms, is more easily changed into toxic neurine than the choline salts employed in his experiments.

Schmidt relies chiefly on the bichloride of platinum as a means of distinguishing between choline and neurine. In combination with this salt, choline forms large, red, easily soluble, tabular crystals belonging to the monoclinic system, and frequently superimposed on each other as stairs; it melts at 232° to 233° C., or 240° to 241° C., according to the quantity employed. The neurine compound separates in small, regular, orange colored, isolated octahedrons, and melts at 211° to 213° C.—Drug. Circ., 1892, 3, from Arch. Pharm., 1891, 467.

## SYNTHETIC COMPOUNDS.

*Antipyretics—Constitution.*—The following tables by A. H. Allen place in a very interesting light the constitution of the derivatives of pyrrol recently proposed as antipyretics.

| | | | |
|---|---|---|---|
| *Piazine.* | *Pyridine.* | *Pyrrol.* | *Pyrazol.* |
| $\mathrm{N}\left\{\begin{matrix}\mathrm{:CH.CH:}\\ \mathrm{.CH:CH.}\end{matrix}\right\}\mathrm{N}$ | $\mathrm{N}\left\{\begin{matrix}\mathrm{:CH.CH:}\\ \mathrm{.CH:CH.}\end{matrix}\right\}\mathrm{CH}$ | $\mathrm{HN}\left\{\begin{matrix}\mathrm{.CH:CH.}\\ \mathrm{.CH:CH.}\end{matrix}\right\}$ | $\mathrm{HN}\left\{\begin{matrix}\mathrm{.N:CH.}\\ \mathrm{.CH:CH.}\end{matrix}\right\}$ |
| *Piazine dihydride.* | *Pyridine dihydride.* | *Pyrroline.* | *Pyrazoline.* |
| $\mathrm{N}\left\{\begin{matrix}\mathrm{:CH.CH:}\\ \mathrm{CH_2.CH_2}\end{matrix}\right\}\mathrm{N}$ | $\mathrm{N}\left\{\begin{matrix}\mathrm{:CH.CH:}\\ \mathrm{.CH_2.CH_2.}\end{matrix}\right\}\mathrm{CH}$ | $\mathrm{HN}\left\{\begin{matrix}\mathrm{.CH:CH.}\\ \mathrm{.CH_2.CH_2.}\end{matrix}\right\}$ | $\mathrm{HN}\left\{\begin{matrix}\mathrm{.N:CH.}\\ \mathrm{.CH_2.CH_2.}\end{matrix}\right\}$ |
| *Piazine hexahydride.* (Diethylene-diamine.) | *Piperidine.* | *Pyrrolidine.* | *Pyrazine.* |
| $\mathrm{HN}\left\{\begin{matrix}\mathrm{.CH_2.CH_2.}\\ \mathrm{.CH_2.CH_2}\end{matrix}\right\}\mathrm{NH}$ | $\mathrm{HN}\left\{\begin{matrix}\mathrm{.CH_2.CH\ .}\\ \mathrm{.CH_2.CH_2.}\end{matrix}\right\}\mathrm{CH_2}$ | $\mathrm{HN}\left\{\begin{matrix}\mathrm{.CH_2.CH_2.}\\ \mathrm{.CH_2.CH_2.}\end{matrix}\right\}$ | $\mathrm{HN}\left\{\begin{matrix}\mathrm{.NH.CH_2.}\\ \mathrm{.CH_2.CH_2.}\end{matrix}\right\}$ |
| *Quinone.* | *Pyrone.* | *Pyridone.* | *Pyrazolone.* |
| $\mathrm{CO}\left\{\begin{matrix}\mathrm{.CH:CH.}\\ \mathrm{.CH:CH.}\end{matrix}\right\}\mathrm{CO}$ | $\mathrm{O}\left\{\begin{matrix}\mathrm{.CH:CH.}\\ \mathrm{.CH:CH.}\end{matrix}\right\}\mathrm{CO}$ | $\mathrm{HN}\left\{\begin{matrix}\mathrm{.CH:CH.}\\ \mathrm{.CH:CH.}\end{matrix}\right\}\mathrm{CO}$ | $\mathrm{HN}\left\{\begin{matrix}\mathrm{.N:CH.}\\ \mathrm{.CO.CH_2.}\end{matrix}\right\}$ |

Piazine has only a hypothetical existence, and the dihydride is known only through its diphenyl-derivative. Pyrone, pyrazol and pyrazine also are only known by their derivatives. Pyrrol is closely related to *thiophene*, which itself has the constitution of a *thiofurfuran*. Many of the reactions of pyrrol are common to thiophene, and are also produced by *carbazol*, which has the constitution of an imido-phenyl. Indole holds a position intermediate between pyrrol and carbazol.

| | | |
|---|---|---|
| *Pyrrol.* | *Indol.* | *Carbazol.* |
| $HN \left\{ \begin{matrix} .CH:CH. \\ .CH:CH. \end{matrix} \right\}$ | $HN \left\{ \begin{matrix} .CH:CH. \\ .C_6H_4. \end{matrix} \right\}$ | $HN \left\{ \begin{matrix} .C_6H_4. \\ .C_6H_4. \end{matrix} \right\}$ |
| *Furfuran.* | | *Diphenylene oxide.* |
| $O \left\{ \begin{matrix} .CH:CH. \\ .CH:CH. \end{matrix} \right\}$ | | $O \left\{ \begin{matrix} .C_6H_4. \\ .C_6H_4. \end{matrix} \right\}$ |
| *Thiophene.* | *Thionaphthene.* | |
| $S \left\{ \begin{matrix} .CH:CH. \\ .CH:CH. \end{matrix} \right\}$ | $S \left\{ \begin{matrix} .CH:CH. \\ .C_6H_4. \end{matrix} \right\}$ | |

*Iodol* is tetra-iodpyrrol $\left\{ \begin{matrix} .Cl:Cl. \\ .Cl:Cl. \end{matrix} \right\}$

The relationship of antipyrine, kairine, thalline, and thermofugin to the pyrazol group is shown by the following table :

| | |
|---|---|
| *Pyrazolone.* | *Pyrazine.* |
| $HN \left\{ \begin{matrix} .N\ :CH. \\ .CO.CH_2. \end{matrix} \right\}$ | $HN \left\{ \begin{matrix} .NH.CH_2. \\ .CH_2.CH_2. \end{matrix} \right\}$ |
| *Phenyl-dimethyl-pyrazolone.* (Isomer of antipyrine.) | *Pyrazine.* |
| $(C_6H_5)N \left\{ \begin{matrix} .N\ :C(CH_3). \\ .CO.CH(CH_3). \end{matrix} \right\}$ | $HN \left\{ \begin{matrix} .NH\ CH_2. \\ .CH_2.CH_2. \end{matrix} \right\}$ |
| *Antipyrine.* | *M—kairine.* |
| $(C_6H_5)N \left\{ \begin{matrix} .N(CH_3).C(CH_3): \\ .CO.CH: \end{matrix} \right\}$ | $C_6H_3(OH) \left\{ \begin{matrix} .N(CH_3).CH_2. \\ .CH_2.CH_2. \end{matrix} \right\}$ |
| *Pyrazoline.* | *Thalline.* |
| $HN \left\{ \begin{matrix} .N:\ CH. \\ .CH_2.CH_2. \end{matrix} \right\}$ | $C_6H_3(COH) \left\{ \begin{matrix} .N(CH_3).CH_2. \\ .CH_2CH_2. \end{matrix} \right\}$ |
| *Pyroglutamic acid.* | *Thermofugine.* |
| $HN \left\{ \begin{matrix} .CH(CO.OH).CH_2. \\ .CO.CH_2. \end{matrix} \right\}$ | $C_6H_3(CO.ONa) \left\{ \begin{matrix} .N(CH_3).CH_2. \\ .CH_2.CH_2. \end{matrix} \right\}$ |

The formulæ of *acetanilide* and its derivatives, although not allied to the pyrrol group, may find a place here :

| | |
|---|---|
| Acetanilide, antifebrine .............................. | $C_6H_5.NH(C_2H_3O)$. |
| Bromacetanilide, bromated antifebrine ............... | $C_6H_4Br.NH(C_2H_3O)$. |
| Methyl-acetanilide, exalgine, methylated antifebrine.... | $C_6H_5.N(CH_3)(C_2H_3O)$. |
| Aceto-amidophenol, hydroxy-antifebrine.............. | $C_6H_4(OH).NH(C_2H_3O)$. |
| Aceto-anisidine, methacetine, methoxy-antifebrine ..... | $C_6H_4(O.CH_3).NH(C_2H_3O)$. |
| Aceto-phenetidine, phenacetine, ethoxy-antifebrine..... | $C_6H_4(O.C_2H_5).NH(C_2H_3O)$. |

The relationship of acetanilide, hypnone and hydracetine is as follows:

| | |
|---|---|
| Acetophenone, hypnone | $C_6H_5.(CO.CH_3)$. |
| Acetanilide, antifebrine | $C_6H_5.NH.(CO.CH_3)$. |
| Acetphenylhydrazide, hydracetine (pyrodine) | $C_6H_5.NH.NH.(CO.CH_3)$. |

—Yearbook Pharm., 1891, 74, from Pharm. Jour. Trans., 1890, xxi., 62.

*Analgene.*—The correct chemical name of this new antipyretic is ortho-oxethyl- and monoacetyl-amido-chinoline. It is the result of an endeavor to unite the acetamido- and oxyethyl groups with a nucleus also having antipyretic effect, so as to produce a new body of corresponding physiological power. The formula is $C_9H_5(OC_2H_5)(NHC_2H_3O)N$. The preparation is given in doses of one gram to alleviate rheumatic pain.—Am. Jour. Pharm., 1892, 309, from Apoth. Zeitg., 1892, 141.

*Acetanilide—For Preserving Hypodermic Solutions.*—Thomas J. Keenan comes to the conclusion that acetanilide is the best preservative, being non-irritating and efficient in dilute solutions. Salicylic acid, according to Keenan, is efficient in much smaller proportions than generally supposed necessary, one-eighth of a grain to the ounce being as useful as one grain; chloroform is too evanescent.—Am. Drug., 1891, 359.

*Acetanilide,* in fine powder, has been recommended as a substitute for iodoform in the treatment of hard and soft venereal sores.—Chem. and Drug., July, 1891, 6.

*Acetanilide (Antifebrine).—Tests for Purity.*—E. Ritsert gives the following: 0.1 gm. is gradually added to 2 c.c. of concentrated hydrochloric acid, and the solution boiled; after cooling and the addition of one or two drops of chlorine water, the liquid assumes a beautiful blue tint. The aqueous solution of acetanilide should not have an acid reaction; on boiling the solution and adding a few drops of ferric chloride, a deep, reddish-brown color should be produced, disappearing on addition of a mineral acid. If to a boiling aqueous solution of acetanilide (1 : 30) a drop of potassium permanganate solution (0.1 : 100) is added, the rose color should remain for five minutes at least, and should not become yellow on boiling afresh. When dried for two hours at 105° C., the sample should fuse at 114° C., and leave no residue on incineration.—Year-book Pharm., 1891, 128, from Journ. Pharm. Chim., xxii., 21.

*Acetanilide (Antifebrine)—Reactions.*—For the explanation of the Roman numerals see p. 1036.

*M. P.* 113° *C.* *B. P.* 295° *C.* $C_6H_5NH.C_2H_3O$.

*a.* Soluble in 200 parts of water at 15° C. and 18 parts of water at 100° C. Easily soluble in ether, chloroform and alcohol.

*b.* If 0.5 gramme of acetanilide be boiled with 5 c.c. of water in a test tube, the latter then removed from the flame and after the lapse of two minutes again heated, the turbid liquid will become clear and the undis-

solved acetanilide will sink to the bottom in drops. The solution does not act upon litmus and is not changed by reagent XXI.

*c.* 0.1 gramme of acetanilide is dissolved in 1 c.c. of reagent XIII; the addition of 3 c.c. of water causes no change, but after an hour, crystals begin to separate.

*d.* 0.1 gramme of acetanilide when heated with 1 c.c. of reagent III and three drops of chloroform, yields phenylisocyanide, $C_6H_5.NC$, which is readily detected by its markedly bad odor.

*e.* If 0.1 gramme of acetanilide be mixed with 1 c.c. of hydrochloric acid and 1 c.c. of a saturated solution of calcium chloride, and the mixture then boiled with about 1 c.c. of a saturated aqueous solution of phenol, a turbid red liquid results, which becomes blue when treated with an excess of reagent I.—Pharm. Review, 1892, 6.

*Antifebrin and Phenacetin—Action of Derivatives.*—It has been shown by Ehrlich that certain kinds of coloring materials taken into the body will distinctly color the brain tissue, but that the introduction into the coloring compounds of a sulpho-group prevents this. H. Aronson brings forward experiments to show that in like manner the influence which certain antipyretics have in lowering temperature in fever through their influence on the nervous centres, is entirely stopped if an acid group be introduced into their composition. If it were possible to introduce an acid element into acetanilid or phenacetin, without destroying their antipyretic properties, a soluble antipyretic could be obtained. But Aronson's observations go to show that this is impossible, and a soluble antipyretic can only be obtained from acetanilid or phenacetin by introducing a basic group. Such a substance is phenocoll.— Am. Journ. Pharm., 1892, 103, from Deut. Med. Woch., 1891.

*Antikamnia—Composition.*—Besides the analyses previously given (see Proceedings 1891, xxxix, 646), F. Hoffmann states that his first analysis (identical with that of C. M. Ford) proved it to be composed of 86 parts of acetanilid and 14 parts of sodium bicarbonate. He communicates an analysis made lately (Oct. 1891) which gives acetanilid 74, caffeine 4, and sodium bicarbonate with tartaric acid 22—all per cent.—Pharm. Rundschau, N. Y., 1891, 268.

*Antipyrine—Preparation.*—Antipyrine is apt to cause vomiting in many persons; Le Perdriel recommends to give it with carbonated water, and especially to give it in troches with tartaric acid and bicarbonate of sodium. —D. A. Apoth. Zeitg., July 1891, 67.

*Antipyrine—Hæmostatic.*—G. Cesari recommends antipyrine as a local hæmostatic.—Am. Journ. Med. Sci., 1891, cii, 404, from Brit. Med. Journ.

*Antipyrine—Preparation.*—L. Knorr and P. Duden have announced a new method of producing antipyrine. On warming a mixture of equal molecules of crotonic acid and phenylhydrazine in an oil-bath to about

115° C., a reaction begins which is accompanied by the evolution of aqueous vapors. The temperature is then raised to 125° C., and when the reaction slackens, the temperature is gradually raised to 160° C., where it is kept for a short time. The end of the reaction is recognized by the fact that a small sample of the mass, when rubbed with a glass rod, easily solidifies.

$C_4H_6O_2 + C_6H_8N_2 = H_2O + C_{10}H_{12}N_2O$. The new body is named by the authors "phenyl-methyl-pyrazolidone." It crystallizes in small, white needles, melting at 84° C., and is easily soluble in alcohol, chloroform, toluol, and glacial acetic acid. By oxidizing substances it is converted into phenyl-methyl-pyrazolon and water.—Am. Drug., 1892, 132, from Pharm. Centralh.

*Antipyrine—Reaction.*—L. van Itallie found that on heating for some time a solution of antipyrine with nitric acid, a cherry-red color is produced, the intensity of which depends on the concentration of the solution and the strength of the acid.—Chem. Zeitg., 1892 (Rep.), 14, from Apoth.-Zeitg., 1892, 28.

*Antipyrine (Phenyl-dimethyl-pyrazolon)—Reactions.*—For the explanation of the Roman numerals see p. 1036.

M. P. 113° C.

$$C_6H_5N < \begin{matrix} CO = CH \\ N.CH_3—\overset{|}{C}.CH_3 \end{matrix}$$

*a.* From a solution of antipyrine (1 in 20) in water, reagent XVII. throws down a crystalline precipitate. Reagent VII. also forms a crystalline precipitate on standing, but reagent XVI. has no effect.—Pharm. Review, 1892, 7.

*Antipyrine Benzoate—Preparation.*—S. Cressati prepares it by adding antipyrine to a boiling solution of benzoic acid; it melts below the boiling point of water, forming a yellow liquid, which solidifies to an opaque, crystalline mass; from the alcoholic solution it is obtained in small crystals. It is almost insoluble in hot or cold water, but quite soluble in alcohol and in ether; it has a faint odor of benzoic acid, and possesses a pungent taste.

*Antipyrine picrate* can be obtained in the same manner; it forms a pale-yellow powder, with the same solubilities. (See also *picropyrin*. Proceedings 1891, xxxix.. 640.)—Am. Journ. Pharm., 1892, 141, from Pharm. Post, 1892, 93.

*Antipyrine—Iodo-derivative.*—Dr. Mortimer Granville, some years ago, spoke highly of the combined use of thalline and papayin as a probable cure for cancer. He now states that he obtained better results by using a periodo-hydromethyloxychinolin (an iodo derivative of antipyrine) instead of thalline. The papayin, of course, as an injection in the tumor.—Am. Drug., July 1891, 200, from Chem. and Drug.

*Antipyrine* and *euphorin* when triturated together become pasty or liquefy, depending upon the proportions; and this property has made it necessary to dispense the two separately, or to enclose one of them in a smaller cachet, and then to enclose this, together with the other, in a larger cachet. J. Mindes has noticed that if euphorin be triturated with sugar (better still, if a small quantity of sodium bicarbonate or powdered licorice be added), and this mixed with the antipyrine by using a spoon or a spatula, instead of the pestle, a powder is obtained which can readily be dispensed in a single cachet.—Am. Journ. Pharm., 1892, 142, from Rundschau, Prag, 1892, 3.

*Aubépine.*—This artificial perfume, which is stated to imitate the odor of hawthorn, is nothing else than anise-aldehyde, according to Schimmel & Co.—Pharm. Rundschau, N. Y., 1892, 120.

*Coumarin—Preparation.*—By the action of chloroform upon an alkaline solution of phenol, salicylous acid or salicylic aldehyde, is first formed:

$$CHCl_3 + C_6H_5(OH) + 4NaOH = C_6H_4{<}{\substack{ONa\\COH}}{>} + 3NaCl + 3H_2O.$$

On treating this compound of sodium with salicylic aldehyde with anhydrous acetic acid, there will be formed, besides sodium acetate, a compound of acetyl and salicylic aldehyde, which at a high temperature is split into water and coumarin ($C_9H_6O_2$). It appears as colorless, shining flakes or rhombic columns, possessing a bitter taste, and melting at 67° C. It boils at 291° C.—Pharm. Post, 1891, 1098.

*Coumarin—Solubilities.*—Schimmel & Co. give the following table of solubilities:

| Dissolve in 100 parts of alcohol. | At 0° C. | 16–17° C. | 29–30° C. |
|---|---|---|---|
| 90 per cent. by volume | 7.1 | 13.7 | 42.5 parts. |
| 80 " " | 6.0 | 12.3 | 38.3 " |
| 70 " " | 4.4 | 9.1 | 26.0 " |
| 60 " " | 3.2 | 6.0 | 16.0 " |
| 50 " " | 1.7 | 3.4 | 8.9 " |
| 40 " " | 0.7 | 1.5 | 3.9 " |
| 30 " " | 0.3 | 0.6 | 1.7 " |
| 20 " " | 0.2 | 0.4 | 0.8 " |
| 10 " " | 0.15 | 0.25 | 0.5 " |

—Pharm. Rundschau, N. Y., 1892, 121.

*Diuretin.*—Marette shows that diuretin cannot be regarded simply as a double salt (sodio-theobromine salicylate). Solutions of it are strongly alkaline, and form an abundant precipitate of theobromine as soon as an attempt is made to neutralize with acids. Wurtz has shown that theobromine is freely soluble without decomposition in solution of soda, forming

"sodium theobromine." Diuretin is therefore a mixture of this compound with sodium salicylate.—Yearbook, 1891, 31, from Journ. Pharm. Chim., 1890, 159.

*Diuretin—Assay.*—L. Lambert has recommended to take advantage of the fact that diuretin is easily decomposed by carbonic acid, the theobromine being easily precipitated, to estimate the proportion of alkaloid in this preparation. Eckenroth, however, shows that the precipitation of theobromine by carbonic acid is incomplete, since some of it remains dissolved in the sodium carbonate formed. A preparation containing 49.7 per cent. of theobromine yielded only 41 per cent. by this method. (Pharm. Zeitg., 1890, 708.) G. Vulpius assays diuretin by dissolving it in water, neutralizing exactly with normal hydrochloric acid, and then rendering faintly alkaline with one drop of dilute ammonia. After several hours the separated theobromine is transferred to a filter, washed with cold water, and dried at 100° C. From 2 gm. of diuretin, the precipitate weighed between 0.82 and 0.83 gm., and about 0.13 remains in the filtrate and washings, thus giving a total of 48 per cent. He states that a good preparation should not contain less than 46½ per cent. The theobromine ought to dissolve readily in soda, and should leave no residue on evaporation. (Chem. Centralbl., 1890, ii., 27.)—Yearbook Pharm., 1891, 32.

*Exodyne.*—This compound, analogous to antikamnia, is recommended in neuralgia, headache, etc. Far from being a real compound, it is merely a mixture of about 90 per cent. of acetanilid, 5 per cent. of sodium salicylate, and 5 per cent. of sodium bicarbonate.—Pharm. Zeitg., 1892, 39.

*Hyacinthine.*—According to Schimmel and Co., this artificial perfume is not a chemical compound, but a mere mixture. Cinnamic alcohol, on the other hand, possesses also a hyacinth odor, and is a real chemical compound.—Pharm. Rundschau, N. Y., 1892, 120.

*Heliotropin.*—Schimmel & Co. call attention to the fact that heliotropin is very sensitive to light and heat; the crystals are apt to lose their perfume entirely within a short time.—Pharm. Rundschau, N. Y., 1891, 275.

*Hydrazine—Poisonous Property.*—According to O. Loew, hydrazine exerts an extremely poisonous action on organisms of the most varying description.—Yearbook Pharm., 1891, 238, from Ber., xxiii., 3203–3206.

*Iodopyrine—Preparation.*—According to the patent of Duroy a hot solution of one equivalent of iodine in twelve parts of alcohol is mixed with a solution of one equivalent of antipyrine in four parts of alcohol, and allowed to crystallize, which will take several days. In order to obtain the amorphous, iodopyrine, the antipyrine is dissolved in three parts of water. Antipyrine bi-iodide is obtained similarly by using two equivalents of iodine.—Zeits. Oesterr. Apoth.-Ver., 1892, 66, from Chem. Zeitg.

*Orexin*—or hydrochlorate of phenyldihydrochinazoline—is prepared by starting from formanilide, making successively sodiumformanilid, ortho-

nitrobenzylformanilid and phenyldihydrochinazoline hydrochlorate. It forms a white powder, melting at 80° C., or colorless acicular crystals. It dissolves in 13 parts of water, as well as in alcohol; insoluble in ether. In the aqueous solution (1 : 20) mercuric chloride produces a white, and potassium bichromate a yellow precipitate. Potassium permanganate is decolorized by it in the cold, and bromine solution with the formation of a yellowish, amorphous precipitate.—Year-book Pharm., 1891, 76, from Pharm. Zeitg., 1890.

*Phenacetin—Hypnotic Value.*—Porcher considers phenacetin as one of the best substitutes for morphine; especially because it is devoid of disagreeable after effects, so that Porcher does not hesitate to administer it to children. The dose for adults is from 0.30 to 0.60 gm. at night.—Zeits. Oester. Apoth.-Ver., 1891, 432, from Bull. med.

*Iodophenine,* a new derivative of phenacetin, is obtained by adding solution of iodine in potassium iodide to a hydrochloric acid solution of phenacetin. It is made upon a large scale by dissolving 600 gm. phenacetin in 5 kilos. glacial acetic acid, adding a solution of 900 gm. hydrochloric acid in 3 kilos. water; and lastly, a solution of 680 gm. iodine in 1,360 gm. potassium iodide and 1,360 gm. of water. If the phenacetin solution be used warm, upon cooling the new compound separates in crystals closely resembling potassium permanganate. Iodophenine possesses a faint iodine-like odor, has a burning taste and colors the skin yellow; it is soluble in glacial acetic acid and in alcohol; insoluble or nearly so in water, benzol, chloroform and 50 per cent. acetic acid. It contains 51 per cent. iodine, which is very easily liberated; heating alone or boiling with water accomplishes it. It has given good results as an antiseptic and a febrifuge.—Dr. Scholvien. Am. Journ. Pharm., July, 1891, 345, from Pharm. Centralh., 1801, 311.

*Phenolid.*—This rival of antikamnia has been shown to consist of acetanilid 58 p. c., and sodium salicylate 42 p. c.—Pharm. Rundschau, N. Y., 1891, 268.

*Piperazine (Piperazidine).*—A. Schmidt and G. Wichmann state that piperazine, the new remedy for uric acid diathesis, is remarkably resistant to decomposition. After a single dose of 3 gm. the piperazine can be detected in the urine with certainty even after six days. The best reagent is a solution of potassio-bismuthic iodide. The urine is first freed from the earthy phosphates by a few drops of soda solution, the filtrate acidulated with hydrochloric acid, heated to about 40° C., and then mixed with the reagent. The amorphous precipitate (which forms even in normal urine) does not contain any piperazine; this is filtered off. After a while there will appear in the filtrate characteristic groups of needles. When only very small quantities of piperazine are present, it is advisable to distil the solid residue, left after the evaporation of the urine, with alkali and sand,

and then test the distillate as before.—Am. Drug., 1892, 9, from Ber., 1891, xxiv., 3237.

*Piperazine.*—Dr. Mendelsohn questions the great utility of piperazine in uric acid diathesis, and points out (what so often is overlooked) that reactions in a test-tube are one thing, and reactions in the animal economy something different. He subjected urinary calculus for weeks to the action of urine of patients who had been treated with piperazine for some time, and also to the action of urine in which piperazine had been dissolved, but in neither case had anything been dissolved. This observation, coupled with others, proved that the addition of a small quantity of urine to an aqueous solution of piperazine considerably diminishes the solvent power of the latter for calculus (the addition of only five per cent. diminishes the solvent power two-thirds).

The editor of "Pharm. Centralh." remarks, that the solvent power is invested solely in the pure piperazine, but not in its salts, and that it therefore is not possible to conceive that the administration of piperazine should be of any benefit whatever.—Pharm. Centralh., 1892, 248, from Deutsche Med. Zeitg.

*Sozoiodol—Usefulness.*—J. Koch finds that sozoiodol is a valuable addition to the remedial armory, and that especially potassium sozoiodolate is not only equal but superior to iodoform.— Chem. Zeitg., 1892, (Rep.) 18, from Wien. klin. Woch., 1891.

*Spermine.*—Fuerbringer reported negative results from the use of the testiculary liquid, named "spermine" by Brown-Sequard; the latter points out that the activity of the liquid in question probably had been destroyed by the antiseptics added by Fuerbringer.—Pharm. Post. 1891, 1010, from Le Pract. (Similar objections might with propriety be made to not a few reported unfavorable results of methods and processes, that the experiments are not made in strict conformity with those of the original observer. —Reporter.)

*Vanillin—Preparation.*—Tiemann and Haarmann prepare it from coniferin. In the spring and early summer the cambium of pine and fir trees is scraped, the juice strained, boiled to free it from the albumin, evaporated to about one-fifth of its volume, and the coniferin allowed to crystallize (1 litre of the cambial juice yields from 5 to 10 gm. of coniferin). It appears as colorless, shining crystals, of a faintly bitter taste, and boiling at 185° C. A concentrated solution of 10 parts of coniferin in boiling water is poured in a thin stream into a moderately warm mixture of 10 parts of potassium bichromate, 15 of sulphuric acid, and 80 of water, and heated for three hours to boiling in a flask (or other apparatus) connected with a return-cooler. After filtration the vanillin is extracted with ether, and purified by means of a little animal charcoal, recrystallizing from water.

Tiemann makes it from eugenol. Oil of cloves is diluted with three times its volume of ether, and shaken with a diluted solution of potassa, which combines with the eugenol. The alkaline solution is acidulated, and shaken with ether; on distilling off the ether, the eugenol is obtained. Eugenol is boiled with anhydrous acetic acid, and the formed aceteugenol oxidized by a dilute solution of potassium permanganate. After filtering, a small excess of potassa solution is added, the solution concentrated by evaporation, acidulated with dilute sulphuric acid, and the vanillin extracted with ether. It is purified by treating the ethereal extract with sodium bisulphite; the vanillin-sodium bisulphite is decomposed by sulphuric acid, the vanillin shaken out with ether, and recrystallized. N. Wender states that when an alcoholic solution is poured on concentrated sulphuric acid, so as to form a layer, the line of contact becomes emerald green. The formula is $C_8H_8O_3$.—Pharm. Post, 1891, 1095.

*Acetovanillone.*—F. Tiemann and W. N. Nagai showed in 1877 that acetyleugenol, on oxidation and subsequent hydrolysis, gives, besides vanillic acid and vanillin, a large quantity of a resinous mass, by the dry distillation of which they obtained guaiacol, apparently as the sole product. On further investigation they find that the resinous mass contains also a crystalline compound, which is obtained by extracting the mass with water, treating the aqueous extract with ether, removing vanillin from the ethereal solution by sodium bisulphite, evaporating the ether, and distilling under a pressure of 50 mm. The distillate solidifies on cooling, and is then further purified. Acetovanillone melts at 115° C., boils at 295–300° C., and sublimes readily. The formula was found to be $C_9H_{10}O_3$. It has the properties of a phenol, yields protocatechuic acid when fused with potash, and stands in the same relation to vanillin as acetophenone does to benzaldehyde.

E. Neitzel has studied the derivatives. T. Otto obtains acetovanillone synthetically by dissolving guaiacol in acetic acid, and gradually adding a mixture of zinc and aluminium chlorides. For the details reference must be had to the original.—Jour. Chem. Soc., 1892, lxi. (Abstr.), 59–62, from Ber., 1891, xxiv., 2855–2870.

## ANILINE COLORS.

*Aniline Colors—Detection in Confectionery and Cakes.*—Instead of extracting the color with ethyl- or amyl-alcohol, G. Possetti recommends to use wool. About 15 gm. of the suspected article is boiled in water, acidulated with a few drops of hydrochloric acid, in the presence of pellets of white wool; when all the color has been extracted, the pellets are repeatedly washed with cold water, and then boiled in ammoniacal water, which will dissolve the dye. The excess of ammonia is removed from the solution by boiling the latter, which is filtered, acidulated with a few drops of hydrochloric acid, and boiled with a few pellets of white wool. Both the

wool and the solution are now tested for the several dyes. Or, the ammoniacal solution is agitated slightly with a little acid and amyl alcohol, when the latter will take up the dye.—Chem. Zeitg., 1891 (Rep.), 215, from Z. Nahr.-Mittel Unter., 1891, 103.

*Methylene-blue* has the property of being excreted with the urine, the yellow color of which is turned to green; this is shown already with 0.2 gm., and is positive proof that the patient really has taken the prescribed medicine.—Am. Journ. Pharm., 1892, 229.

*Methylene Blue—In Malaria.*—This dye has been proposed by Guttmann and Ehrlich for the treatment of malaria (suggested by its affinity to the plasmodium of malaria, being the best stain for it). The treatment being followed by an intense blue coloring of the urine, and the fæces becoming blue on exposure to light, it is not very likely that methylene blue will be much used outside of hospitals.—Am. Drug., 1891, 363, from Pharm. Journ. Trans., Nov., 1891.

*Methylene Blue and Methyl Blue*—Both of these substances have been introduced into medicine, and used for quite different purposes, nevertheless they are continually confounded. *Methyl blue* is recommended as an antiseptic in diphtheria and certain other diseases, chiefly applied in the form of a powder containing 2 parts of the blue to 98 parts of sugar.

*Methylene Blue* is given internally in doses of about 3 grains (in pills or capsules), in rheumatism of the joints and muscles; also as an analgesic, administered hypodermatically in doses of $\frac{1}{10}$ to 3 grains; and recently in doses not to exceed 10 grains per diem.

*Methyl Blue* is the sodium salt of triphenyl-pararosaniline-sulphonic acid. It is known as Methylblue M B I for cotton, and in German also under other names. It constitutes a dark-blue powder, soluble in water, forming a blue solution. The latter is not altered by hydrochloric acid. Addition of soda renders the solution reddish brown. In concentrated sulphuric acid, methyl blue dissolves with a reddish-blue color, which turns to blue upon dilution with water.

*Methylene Blue,* also known as Æthylenblau, Methyleneblue D B B, is a salt of tetramethylthionine (a body classed with the so-called thiazines, which are sulphurated derivatives of the aniline series). The most usual salt met with in the market is the double chloride of *zinc* and tetramethylthionine. According to Schultz ("Chemie des Steinkohlentheers," ii., 762), the simple hydrochlorate of the base is also put on the market under the name of methylene blue. But we have so far not encountered the latter, all the samples which have come under our notice being the *zinc* salt, leaving on combustion about 10 per cent. of zinc oxide. It is possible that a zinc-free methylene blue is now on the market, but, as we have not had any occasion to examine the article for some months, we cannot be

sure. At all events, it behooves those who use methylene blue internally to know whether they are given a zinc salt or not. Hence every fresh supply should be examined for zinc, which is easily accomplished by igniting a small weighed quantity in a crucible (which may be much facilitated by moistening the carbonized and cooled mass occasionally with a little water and nitric acid) until all signs of carbon have been burned off. The residue, if consisting of zinc oxide, will give the appropriate reactions.

*Methylene Blue—A Question for Pharmacologists.*—We are unable to say whether the first proposers of methylene blue as an internal remedy were aware of the presence of zinc in the commercial article, or whether they used a zinc-free product. At all events, we are aware that many physicians who used the substance in this country employed the commercial article containing zinc. The question is now, What difference in therapeutic action is there between the two products, that containing zinc and that free from it? And did the beneficial effects of the remedy depend on the organic coloring matter exclusively, or on its combination with zinc? This is a problem to be solved by the pharmacologists.—Am. Drug., 1892, 8.

*Pyoktanin (Methyl Violet)—Antiseptic Value.*—F. F. Burchard reports on the whole favorably on the use of pyoktanin. In gonorrhœa he prefers to use a 1-in-3,000 solution, in order to avoid smarting. In the treatment of ulcers he has found the dry powder far superior to iodoform.—Chem. and Drug., July 25, 1891, 114.

*Pyoktanin—Uses.*—Jaenicke found that the development (but not the life) of the following bacteria was arrested by solutions of the dilutions quoted in each case: Bacillus of cholera, 1 : 62,500; coccus of pneumonia, 1 : 1,000,000. To destroy their life, or vitality, stronger solutions were required: from 1 : 1,000 to 1 : 5,000, applied for one-half minute. Pohl states that it is not claimed that it has advantages over corrosive sublimate and similar antiseptics, when the object is to prevent a wound from becoming septic; but that pyoktanin comes especially into use, when the object is to disinfect a wound, which has become infected or septic.—Am. Drug., July 1891, 225.

See also under *Acidimetry (Indicators)* and *Coloring Matters.*

## COLORING MATTERS.

See also under *Aniline Colors, Acidimetry (Indicators).*

*Chlorophyll—Preparation.*—Grass is pounded with a little water, expressed, the juice heated to boiling, the green curd expressed, and extracted with alcohol. The alcoholic solution is evaporated and the residue triturated with hot water; the flocculent, green mass, which is left behind, is dissolved in hydrochloric acid, and precipitated with water.—Zeits. Oester. Apoth.-Ver., 1891, 408, from Industrie Bl.

*Chlorophyll—Adulterations.*—The purity of chlorophyll can best be determined by its behavior to ammonia, sulphuric, hydrochloric and nitric acids. Ammonia alters the color of pure chlorophyll to dirty green; sulphuric acid to canary-yellow; hydrochloric acid to dirty yellowish-green; cold nitric acid to dirty-green, but the boiling acid to white with a slight yellowish shade.—A. Gawalowski, Zeits. Oesterr. Apoth.-Ver., 1891, 408.

*Chlorophyll—Detection of Aniline Green.*—This coloring matter has been used extensively for coloring ointments, oils, and also preserved vegetables a handsome green, having the advantage of being entirely innocuous. Of late it has been found adulterated with aniline green, which can be detected by dissolving a little in ether, and allowing the well-stoppered test-tube or bottle to stand undisturbed for a time. The aniline green will be deposited; on adding an equal volume of water and shaking, the water will separate more or less colored. If the chlorophyll is pure, the water will remain colorless.—Zeits. Oesterr. Apoth.-Ver., July 1891, 346.

*Chlorophyll—Substances Which Accompany It.*—By heating the leaves of the vine with carbon bisulphide, A. Etard has succeeded in dissolving out a number of chemical substances of definite chemical composition, some of them new. A portion thus extracted is soluble in alcohol, a portion insoluble. The soluble portion yields a substance with the composition $C_{17}H_{14}O$, which he calls "vitol," and a substance soluble in ether, a diatomic alcohol, to which he gives the name "vitoglycol" with the empirical formula $C_{23}H_{44}O_2$, the true composition of which is probably $C_{23}H_{42}$-$(OH)_2$. This is accompanied by a triatomic alcohol called "oenocarpol."

With similar treatment the leaves of the lucerne yielded a monatomic alcohol "medicagol" with the formula $C_{20}H_{14}OH$. From Bryonia dioica a hydrocarbon $C_{26}H_{42}$ was obtained, which he calls "bryonane." The substances to which the term "wax of leaves" has been applied are probably a mixture of these bodies with crystalline paraffines.—Pharm. Journ. Trans., April 1892, 889, from Comptes rendus, 1892, cxiv., 364.

*Chlorophyll*, its *relation to iron*, see under *Ferrum*.

*Indigocarmine—Synthesis.*—According to B. Heymann it can be advantageously made on the large scale by mixing 1 part of phenylglycocine with 10–20 parts of sand and adding gradually 20 times the quantity of fuming sulphuric acid (80 per cent. anhydride), the temperature not being allowed to rise above 30° C. The yellow solution, on addition of ordinary concentrated sulphuric acid, evolves sulphurous anhydride, and assumes the deep blue color of indigo; ice is then added, and the color precipitated by the addition of sodium chloride. The yield is about 60 per cent. of the phenylglycocine employed.—Journ. Chem. Soc., Sept. 1891, 1069, from Ber., xxiv., 1476–1478.

*Indigo—Artificial.*—The best yield hitherto obtained by the various synthetical methods has been about 15 per cent. by Heumann. A. Haas

succeeded in improving the process so that the artificial indigo now can compete with the natural article. He treats phenylglycocoll with fuming sulphuric acid at low temperatures (—5° C.), when it dissolves very readily in the acid with a yellow color, which on dilution with ordinary sulphuric acid, changes to the intense blue of indigo; adding sodium to this solution, indigo carmine is precipitated.—Am. Jour. Pharm., Aug. 1891, 406, from Suedd. Apoth. Ztg., 1891, 172.

*Indigo Green.*—Soxhlet accidentally discovered a green color produced by the action of ammonia in excess on indigo carmine. This color has a shade approaching that of methyl green, which it also resembles in not appearing blue in artificial light.—Chem. News, July 31, 1891, 58, from Chem. Zeitg., xv., 913.

*Indigo—Uses.*—Amenorrhoea has been cured by a powder consisting of 60 grains of indigo and 15 grains of subnitrate of bismuth, taken once or thrice per day.—Chem. and Drug., July 25, 1891, 139.

*Indigo Red—Detection in Urine.* See under *Urine.*

*Lackmoid—Preparation.*—Schaerges proceeds somewhat differently from Hock and Traube. He obtains it from resorcin by the action of sodium nitrite at a temperature not exceeding 110° C. (but without water.) The product is dissolved in a little water, and freed from undecomposed resorcin by ether. Lackmoid dissolves in any proportion in water and diluted alcohol, and is insoluble in ether. The red coloring matter which is produced on acidulating the aqueous solution, is taken up by ether; this serves as a distinction from litmus.—Zeits. analyt. Chem., 1892, 68, from Schweiz. Woch. Schr. Pharm., 1891, 99.

See also under *General Organic Chemistry.*

*Litmus—Purification.*—According to J. Luettke, 100 gm. of coarsely powdered litmus are extracted with warm water. The solution is evaporated to about 200 c.c., acidulated strongly with hydrochloric acid (about 20 gm. of a 25 per cent. acid), and dialyzed until all the acid has been removed. The solution remaining in the dialysator is stated to be more sensitive than phenolphthalein. The evaporated solution is either scaled, or precipitated by alcohol, and dried in air, free from carbonic acid.—Pharm. Post, 1891, 1081, from Apoth. Zeitg., 1891, 643.

See also under *Test Paper, Charta* and *Acidimetry* (*Indicators*).

*Isatin-blue—Preparation.*—C. Schotten first prepares *dipiperidylisatin*, $C_{18}H_{22}N_4O$, by heating an alcoholic solution of 10 gm. isatin with 2 molecular proportions of piperidine for an hour on the water-bath, and washes the crystals with alcohol; the yield is about 15 gm. It crystallizes from alcohol in colorless, flat prisms, does not decompose at 100° C., and is sparingly soluble in alcohol, insoluble in benzene and chloroform; with mineral acids it gives a blood-red solution, in glacial acetic acid it dis-

solves with decomposition, and production of a red color; heated at 150° C., a blue color is produced. Isatin-blue is next prepared by shaking dipiperidylisatin with several times its weight of acetic anhydride in a closed flask, at the ordinary temperature or at 60° C., pouring into water, collecting and washing with water. It is a blue powder, of which a streak on a glass plate appears yellow in reflected and blue by transmitted light. It decomposes at 230° C., a brown oil passing over, and forms a deep-blue solution with glacial acetic acid. When dipiperidylisatin (2 mols.) is treated with acetic anhydride, piperidine (about 2 mols.) is obtained, which leads to the formula $C_{21}H_{17}N_3O_4$ for isatin-blue, whilst the values obtained by the elementary analysis of the latter agree with the formula $C_{36}H_{30}N_6O_4$; its formation and constitution are therefore obscure.—Jour. Chem. Soc., Aug. 1891, 928, from Ber. xxiv., 1366–1373.

*Organic Dyes—Chemistry.*—F. W. Passmore has a long paper on this subject which can not well be abstracted. Reference must be had to the original in Pharm. Journ. Trans., Dec. 1890, 504, 547, 567.

*Vegetable Yellow-coloring Principles.*—Arnaudon gives a list of plants which contain berberin and related yellow-coloring principles belonging to the following families: Berberidaceæ, Menispermeæ, Ranunculaceæ, Xanthoxylaceæ, Rutaceæ, Anonaceæ, Apocyneæ, Leguminosæ, Papaveraceæ, Gentianeæ.—Apoth. Zeitg. (Rep.), 1891, 94, from Mon. Sci., 1891, 483.

*Alizarinsulphonic Acids, Conversion of Anthraquinone and Disulphonic Acids into Flavopurpurin and Anthrapurpurin.*—By R. E. Schmidt. Journ. Chem. Soc., Aug. 1891, 934, from J. pr. Ch. (2), 232–237.

*New Dyes of the Anthraquinone Series.*—R. E. Schmidt and L. Gattermann describe a new dye "alizarinbordeaux," $C_{14}H_4O_2(OH)_4$, which is prepared by acting on alizarin (1 part) with 70–80 per cent. anhydrosulphuric acid (10 or more parts) at 25–50° C. for four days, and then pouring the mixture into melting ice. An acid sulphate is thus obtained which is dissolved in an alkali, and the solution acidified and heated, whereby "alizarinbordeaux" is precipitated. It dissolves in strong sulphuric acid with a bluer color than that of the original substance. The authors further describe several derivatives.—Journ. Chem. Soc., Aug. 1891, 935, from J. prakt. Ch. (2), xliii, 237–252.

*Colored Lakes—Formation.*—The heats of neutralization of stannic acid and metastannic acid respectively by potassa are in the ratio of 32.7 : 2.3, and these numbers may be taken as measuring the relative energy of the acid functions. If the two acids are boiled with phenosafranine in presence of sodium sulphate, and the precipitates washed until the washings are colorless, it is found that stannic acid has formed an intensely red lake, whilst the metastannic acid has acquired only a very pale rose tint. In this case, the absorption of a basic coloring matter is coincident

67

with the existence of a strongly marked function in the absorbent.—L. Vignon. Journ. Chem. Soc., July 1891, 807, from Compt. rend., cxii., 580.

*Colored Lakes.*—C. O. Weber defines a lake pigment as the insoluble salt of either a color base or a color acid. After discussing the conditions under which lakes are formed from basic colors by means of tannic acid, he proves that, ordinarily, both color-makers and dyers use wrong proportions of color and tannic acid, resulting in products deficient in beauty of shade and fastness to light and atmosphere. Weber has estimated the quantities of tannic acid required by all the different basic coloring matters known at present. The most important result to be drawn from his investigations is, that, with one exception, each molecule of coloring matter requires two molecules of tannic acid.—Chem. Drug., Nov. 1891, 697, from Soc. Chem. Ind.

*Dyeing—Theory.*—L. Vignon has previously shown that animal fibres, which dye easily, have well marked acidic or basic functions, whilst in vegetable fibres, which dye with difficulty, such functions are very feeble; that cotton, when heated with ammonia, takes up nitrogen, acquires a basic function and dyes readily with acid coloring matters: that the power of stannic acid to combine with basic coloring matters is proportional to the energy of the acidic function of the acid; moreover, all the mordants employed in dyeing are either basic or acidic oxides. All soluble coloring matters, natural and artificial, contain a salifiable group, OH, or a basic group, $NH_2$, or an acidic group, $NO_2$. The author concludes that dyeing textile fibres with soluble coloring matters or metallic oxides is a process of purely chemical order, and depends essentially on the presence of basic and acidic functions in the coloring matter and its absorbent. The only exception to this law is the group of tetrazoic colors which dye cotton in alkaline bath without a mordant.—Journ. Chem. Soc., July 1891, 832, from Compt. rend., cxii., 623.

## ALBUMINOIDS.

*Albuminoids—Formation of Bases.*—See under *Urea.*

*Albuminoids—Effect of Saccharin on the Digestion.*—A. Stutzer carried out the following experiments with arachis cake, the albuminoids of which are very quickly digested: 1, saccharin without gastric juice or hydrochloric acid; 2, action of varying amounts of saccharin on 100 mgm. of nitrogen, in the form of digestible albumen, in presence of 0.05 per cent. of HCl; 3, same as the foregoing, but with gastric juice also; 4, same as the last, but with 10 and 15 per cent. of HCl respectively. The action of saccharin alone is to considerably lessen the solubility of albuminoids in water. In the experiments with gastric juice and acid there was a distinct disturbing influence exercized by saccharin, although the action was less marked in the experiments in which the stronger acid was used.—Yearbook Pharm., 1891, 113, from Landw. Ver.-Stat., xxviii., 63–68.

*Protecting Albuminoids.*—Hankin applies this term to albuminoids which protect the organism against bacteria, and he distinguishes between

*Sozines*, which are normally present in the animal body, and

*Phylaxines*, which are to be found in the body of animals (and man) which by artificial means have been rendered proof against one or more diseases.

Sozines he divides into two classes: (1) *Mykosozines*, which destroy the bacteria, as for instance the alkaline globuline of rats, and certain neutral globulines of other animals. (2) *Toxosines*, which render the bacterial poison innocuous, as, for instance, the blood-serum of rabbits, which according to Gamaleia destroys the poison of Vibrio Metschnikovi.

Phylaxines he divides likewise into two classes: (1) *Mykophylaxines*, which destroy the bacteria, as, for instance, that albuminoid in "immune" rabbits which kills the bacillus of hog-cholera. (2) *Toxophylaxines*, which destroy the bacterial poison, as, for instance, the tetanus-antitoxine of Tizzoni and Cattani.

Bucher terms all protecting albuminoids *Alexines*.—Pharm. Post, 1892, 582, from Pharm. Centralh., 1892, 231.

*Albumin—Quantitative Estimation.*—Luigi Devoto adds to the albuminous liquid, which is contained in a beaker or flask, sufficient ammonium sulphate to make a saturated solution in the cold (about 80 gm. to 100 c.c.), and heats it until the salt is dissolved. The beaker is next exposed to the heat of a steam bath for 30 to 40 minutes, when all the albumen has been completely coagulated. If the exposure to the heat has been prolonged to a couple of hours, the coagulated albumen will have contracted in volume, so as to facilitate the filtering and washing. The reaction of the albuminous liquid does not influence the coagulation in any way; even the urine needs no preliminary treatment.—Pharm. Rundschau, N. Y., 1891, 222; from Zeits. physiolog. Chem., 1891, 465.

*Albumin, Albumose and Peptone—Distinction.*—M. Flaum states that the characteristic precipitates produced by nitric acid, acetic acid and sodium chloride, and acetic acid and potassium ferrocyanide, do not disappear on heating if due to albumen. If they disappear on heating and re-appear on cooling they are due to albumoses. Peptones cause no precipitates. Albumoses and peptones may be distinguished by the behavior to ammonium sulphate, which precipitates albumoses, but not peptones. Add the powdered sulphate to saturation; the precipitation of the albumoses takes about twenty-four hours.—Schweiz. Wochens. Pharm., 1891, 407.

*Albumen—Tests.*—B. Vas has made a comparative examination of the different tests for albumen, and arrived at the following results:

| | Dilution. |
|---|---|
| Acetic acid and mercuric chloride | 1 : 2000 |
| Nitric acid and magnesium sulphate | 1 : 7000 |
| Hydrochloric acid and chlorinated lime | 1 : 10,000 |
| Boiling test | 1 : 20,000 |
| Acetic acid and sodium chloride | 1 : 20,000 |
| Acetic acid and potassium sulphocyanide | 1 : 25,000 |
| Acetic acid and potassium ferrocyanide | 1 : 45,000 |
| Trichloracetic acid | 1 : 50,000 |
| Sulphosalicylic acid | 1 : 50,000 |

The last test is more reliable than trichloracetic acid, because the latter renders turbid urines containing an excess of urates. The sulphosalicylic acid test is carried out by adding a few crystals to the urine, and shaking; a turbidity indicates albumen.—Pharm. Post, 1892, 680, from Therap. Monatshefte, 1892, 270.

*Albumen—Preservation of Solutions.*—R. A. Cripps recommends the addition of 10 per cent. of acetic acid, which will prevent the decomposition for weeks.—Canadian Ph. J., July 1891, 180.

*Albumen.*—Detection in *urine.*—See under *Urine.*

*Albuminates.*—See the respective bases.

*Albumone.*—This substance is obtained from blood serum by coagulating the serum, evaporating at 100° C., and extracting the mass by water at 100° C. The filtered liquid is precipitated by alcohol, and purified by reprecipitation. It differs from albumin by being coagulated by alcohol, but not by heat, even in the presence of acetic acid. Nitric acid gives a precipitate soluble in a slight excess; potassium ferrocyanide in presence of acetic acid gives a milkiness, increasing with time; ammonium phosphomolybdate gives a white precipitate on heating; acid mercuric nitrate, a yellow precipitate; Millon's reagent a white one, becoming rose-colored on heating. Albumone yields no biuret reaction. It is strongly lævorotatory, and does not dialyze.—Journ. Chem. Soc., 1892, lxi. (Abstr.), 224, from Comptes rendus, cxiii., 557–559.

*Proteids—Test.*—J. A. MacWilliam recommends salicylsulphonic acid as a powerful precipitant of proteids. Solutions containing only 1 part in 100,000 parts of water still show an opalescence when treated with a few drops of the reagent. The precipitate produced with albumins and globulins is not soluble on heating; that produced with albumoses and peptones is dissolved, reappearing when the liquid cools.

*Proteids—Behavior to Salicylsulphonic Acid.*—MacWilliam divides the proteids into three classes, according to their behavior to salicylsulphonic acid:

(a) *Heat-coagulable proteids (albumen, globulin, myosin, etc.), and derived albumens (acid-albumen and alkali-albumen).* Precipitate does not dissolve on heating, but becomes coagulated.

(*b*) *Albumoses.* Precipitate redissolves on heating, and reappears on cooling. To precipitate deutero-albumose effectively, the fluid should first be mixed with twice its bulk of saturated ammonium sulphate solution.

(*c*) *Peptones.* No precipitate, except in solutions already saturated with ammonium sulphate. If other tests (biuret, etc.) show presence of proteid, and no precipitate is given by salicyl-sulphonic acid, the proteid present must be peptone. A precipitate in ammonium sulphate solutions indicates the presence of peptone; it is readily redissolved on the addition of a little water or glycerin.

The fact that peptone is not precipitated by salicylsulphonic acid, except when the solution is saturated with ammonium sulphate, is of much importance. For, while fluids saturated with ammonium sulphate, can only contain one proteid (peptone), fluids not so saturated may in addition to other proteids contain two (peptone and albumose) the reactions of which are for the most part identical. By means of the salicylsulphonic acid test, it becomes easy to determine quickly which is present; for albumose gives a precipitate, at least when two-thirds saturated with ammonium sulphate, while peptone does not.—Journ. Chem. Soc., July, 1891, 892; from Brit. Med. J., i., 1891, 837-840.

*Proteids—Action of Alcohols and Aldehydes.*—By T. L. Brunton and S. Martin. Solutions of the following proteids were used: (1) egg-albumen; (2) serum-albumen, containing a little serum-globulin; and (3) a mixture of proto- and deutero-albumose prepared from Witte's "peptone." The solution was dropped into six times its bulk of an alcohol or aldehyde, and the following points noted: (*a*) whether the reagent precipitated the proteid; (*b*) Whether the precipitate was rendered insoluble in distilled water, by the prolonged action of the reagent; (*c*) Whether any change of color occurred in the precipitate. The reagents employed were: Allyl, amyl, ethyl, heptyl, methyl, isobutyl, isopropyl, octyl, propyl, and tertiary butyl alcohols; acetaldehyde, isobutylaldehyde and propaldehyde. The general result obtained is that the higher alcohols have a less powerful action in precipitating and coagulating proteids than the lower ones. Allyl alcohol stands apart from the others as the most powerful precipitating and coagulating agent employed.—Journ. Chem. Soc., Aug. 1891, 947, from J. Physiologie, xii., 1-4.

*Proteids—A Product of Putrefaction.*—S. Gabriel and W. Asnan find that $\delta$-amidovaleric acid, prepared from benzoylpiperidine by C. Schotten and also by a synthetical method by S. Gabriel, is identical with the compound obtained by the putrefaction of fibrin and flesh by E. and H. Salkowski. Neither of these compounds is poisonous; they dissolve copper oxide but not silver oxide, and give neither a precipitate nor a blue coloration with ammoniacal silver and copper acetate solutions respectively.—Jour. Chem. Soc., Aug. 1891, 948, from Ber., xxiv., 1364-1366.

*Bile.*—See under *Biliary Substances.*

## BLOOD.

*Blood—Composition of the Ash.*—K. Landsteiner refutes the statement of Verdeil that the salts of the blood vary with the food; an animal fed on flesh has in the blood alkaline phosphates, which are replaced by carbonates when a vegetable diet is given.—Jour. Chem. Soc., 1892, lxi. (Abstr.), 225, from Zeitz. physiol. Chem., 1892, 13–19.

*Blood—Recognition.*—Charles O. Curtman has written an article covering the optical and chemical means for the recognition of blood, and also discussing the possibility of distinguishing between the blood of man and that of various animals, said article being accompanied with a diagram of the respective sizes of the blood corpuscles and a chart of the spectra of the different coloring matters of the blood. This article not being suitable for extraction, reference must be had to the original. He justly emphasizes the old truth that it requires experts to draw correct conclusions from observations.—Pharm. Rundschau, N. Y., 1892, 54–59; Am. Drug., 1892, 68–72.

*Blood—Coagulation.*—Pekelharing has collected data in proof of the necessity of the presence of calcium salts for the coagulation of the blood. This opinion is supported not only by the observation of Ringer and Sainsbury that coagulation is hastened by the addition of small quantities of calcium salts, especially the chloride, but also indirectly by the observation of Arthus and Pages, that the coagulation may be entirely prevented if, immediately on being shed, the blood is mixed with small quantities of substances, like oxalates and fluorides, which precipitate calcium salts as very insoluble compounds. The action of peptone in hindering coagulation can be explained by the affinity between peptone and calcium compounds. This view is supported by the fact that other substances like soap, which combine with calcium compounds, produce similar symptoms to those set up by peptone. Thus there is loss of coagulability of the blood, low blood pressure, suppression of secretions, and even death. The toxic effects appear to be due to the removal of calcium salts, which are necessary for all vital processes. It is, moreover, a fact that injection into the circulation of calcium chloride simultaneously with the peptone, or after the peptone, obviates the poisonous effects of the latter; peptone is then no longer capable of rendering the blood uncoagulable.—Am. Jour. Pharm., 1892, 201, from Jour. Chem. Soc., 1892, 87.

*Blood—Decolorization.*—Forensic examinations of blood are often rendered easier when the blood is freed from hæmoglobin. R. Kobert recommends pure zinc dust, which not only precipitates the hæmoglobin, but also renders old blood nearly odorless. The following precautions are necessary: (1) The blood must be rendered nearly neutral (naturally it is generally decidedly alkaline); (2) It must be free from metahæmoglobin; (3) It must be diluted with at least 3 to 5 times its volume of

water; (4) The zinc dust must be pure, that is, consist only of zinc and oxide of zinc; (5) The zinc dust must amount to at least one-fourth or one-half of the original weight of the blood; (6) The mixture of zinc dust and blood must be shaken vigorously for some time.—Am. Jour. Pharm., 1861, 606; from Chem. Zeitg., 1891, 1375.

*Blood—Specific Gravity.*—J. B. Haycraft recommends an easy method for ascertaining the specific gravity of blood, which is quite accurate, rapid, and requires only one drop. This method is not new, but has never been applied to blood. Two mixtures of benzyl chloride (sp. gr. 1.100) and toluene (sp. gr. 0 8706) are made, one (a) having a sp. gr. of 1.070, and the other (b) with a sp. gr. of 1.020. One c.c. of (a) is measured off in a pipette, graduated to 0.01 c.c., and run into a glass tube in which is also the drop of blood, which floats on the surface in globules; (b) is now added until the globules show no tendency to rise or sink, the sp. gr. of the liquid is then calculated, and a correction made for temperatures other than 15.°6 C., namely, 0.88 sp. gr. for every 2° C. above 15.°6C.—Journ. Chem. Soc., Sept. 1891, 1123, from Proc. Roy. Soc. Edin., xviii., 251-254.

M. Glogner found the specific gravity of the blood of Europeans living in the tropics less than the normal (1.053 instead of 1.062). The specific gravity was determined by Hammerschlag's method: Placing a drop in a mixture of benzol and chloroform, and then adding benzol or alcohol until the drop of blood swims. The mixture is filtered through linen, and the sp. gr. noted.—Jr. Ch. Soc., 1892, 363, from Virchow's Arch.

O. Eickman has also investigated the specific gravity of blood, but finds that the variation is not so great, only 1.057 against 1.059. He took the specific gravity with Schmaltz's pycnometer.—Jour. Chem. Soc., 1892, lxi., Abstr., 363, from Virchow's Archiv, cxxvi, 109–124.

*Blood—Detection of Carbonic Oxide.*—According to M. Rubner, the blood is shaken for a minute in a test-tube with four or five volumes of lead acetate solution. Blood containing carbonic oxide remains red, whilst normal blood becomes brownish and ultimately chocolate-brown and greyish-brown. The difference is stated to be still recognizable when the carbonic oxide blood is diluted with eight or nine volumes of normal blood.—Yearbook Pharm., 1891, 111, from Zeits. analyt. Chem., xxx., 112.

*Blood—Detection of Carbonic Oxide.*—A. Wetzel obtains a similar color difference by mixing 10 c.c. of the blood with 15 c.c. of a 20 per cent. potassium ferrocyanide solution and 2 c.c. of acetic acid (1 vol. glacial acid and 2 vols. water), and shaking gently. If only a very small quantity is available, it is diluted with 4 to 10 vols. of water, and to 10 c.c. of this mixture are added 5 c.c. of the potassium ferrocyanide solution and 20 drops of acetic acid.

The following is still more delicate: The blood is diluted with 3 vols. of water, then mixed with 3 vols. of a 1 per cent. solution of tannic acid, and well shaken. After twenty-four hours, normal blood has a gray color, whilst the carbonic oxide blood has become carmine-red.

The presence of 0.0023 per cent. of carbonic oxide in air was detected by the last test.—Yearbook Pharm., 1891, 111, from Chem. Centralbl., 1889, 738.

*Blood—Detection of Hydrocyanic Acid.*—The red color of blood changes to yellow on oxidation, but if hydrocyanic acid is present, the color turns bright red. This property has been made use of for a delicate test for hydrocyanic acid, which see under that acid.—Kobert. D.-A. Apoth. Zeitg., 1891, 72, from Apoth. Zeitg. (Berlin.)

*Cyanmethæmoglobin.*—A product of the action of hydrocyanic acid upon blood, causing the latter to assume a bright-red color, which can be used as a test for the presence of hydrocyanic acid in blood. See under *Hydrocyanic acid.*—D. A. Apoth. Zeitg., Aug. 1891, 72, from Apoth. Zeitg. (Berlin.)

*Blood—Destruction of Sugar by a Ferment.*—R. Lepine and M. Barral confirm the existence in the blood, and especially in the chyle, of a glycolytic ferment, possessing the power of destroying glucose. This ferment is excreted chiefly, though not solely, from the pancreas. Its action is accelerated by a rise of temperature. It disappears in the blood of patients suffering from diabetes. This ferment may be isolated from defibrinated blood by separating the corpuscles from the serum, and repeatedly extracting the former with solution of sodium chloride.—Yearbook Pharm., 1891, 111, from Comptes rendus, cx., 1314; cxii., 146, 411.

*Hæmatogen.*—Marfori obtains an organic iron compound, which is stated to be completely absorbed. Egg-albumen is dissolved in solution of potassa, ferric tartrate added to the filtrate, and the solution precipitated by the addition of acetic acid. The precipitate, an albuminate of iron, forms after drying, a straw-yellow, voluminous powder, easily soluble in weak alkaline solutions, and contains 0.7 per cent. of iron.—Deutsch-Am. Apoth.-Zeitg., 1892, xiii., 19, from Deutsche Med.-Zeitg.

*Hæmoglobin—Therapeutical Value.*—Dr. Pietro Castellino highly extols the use of hæmoglobin in anæmia and gastric disorders. It acts quickly, and does not cause any distress or constipation. The daily dose is given as 0.2 gm.—D.-A. Apoth. Zeitg., July 1891, 67.

*Hæmol and Hæmogallol.*—Kobert has produced two new iron preparations by the action, respectively, of zinc-dust and pyrogallol upon the coloring matter of blood. He recommends them in the treatment of chlorosis as being more easily assimilable than any other iron preparation. Hæmol is a brownish-black powder, and hæmogallol is reddish-brown; the dose is 0.1 to 0.5 gm. three times a day. Hæmol contains a very small per-

centage of zinc, which is done purposely, it having been shown that zinc is beneficial in intestinal ulcerations and other sores.—Pharm. Post, 1891, 1034, from Merck's Bull.

*Dairy Products—Methods of Analysis.*—Official methods of analysis of the Association of Official Agricultural Chemists for 1890–91 will be found in a series of papers in Chem. News, 1892, lxv., 268, 280, 290, 305.

*Casein—Soluble.*—A. Béchamp prepares it by adding pure acetic acid drop by drop to the milk just drawn from the cow or goat, until the milk turns litmus paper a pale pink; the coagulum, which soon separates, is collected, and, after drying by a filter pump, is treated with ether to remove fat. It is then suspended in an equal volume of water containing ammonium carbonate, and the mixture is filtered. The filtrate is mixed with acetic acid in just sufficient quantity to precipitate the casein, which by a repetition of the above treatment is obtained pure.—Yearbook Pharm., 1891, 109; from Bull. Soc. Chim., lv., 181–186.

*Caseinogen.*—S. Ringer states that casein is formed by means of pure rennet and caseinogen; and that thus phosphoric acid does not seem necessary for efficient rennet action. Bicarbonate of sodium antagonizes the action of rennet and calcium chloride. The clotting of the milk by rennet consists of two processes: first, the conversion of caseinogen into casein by rennet; secondly, the union of the latter with a lime salt leading to its precipitation. Calcium chloride favors the aggregation of minute particles into masses (curds).—Jour. Chem. Soc., Aug. 1891, 951; from J. Physiolog., xii., 164–169.

——— Caseinogen and lactalbumen are the only proteids contained in milk. Lactoglobulin does not exist; it is owing to the error of not recognizing that the two salts, sodium chloride and magnesium sulphate, when both present to saturation, precipitate albumen, that this proteid has been supposed to exist. The proteids variously called lactoprotein, peptone and hemialbumose do not exist in milk. When milk turns sour owing to the lactic acid fermentation, primary proteoses, chiefly proto-proteose, are developed.—W. D. Halliburton. Yearbook Pharm., from Jour. Physiol., xi., 448–463.

*Kefir in Intestinal Putrefaction.*—A. Rovighi comes to the result that the quantitative estimation of the ethereal hydrogen sulphates in the urine is a trustworthy criterion of the amount of putrefactive change in the intestine; it will, however, be necessary to examine a specimen of the mixed 24 hours voiding. After discussing various substances proposed for lessening the putrefaction, all of which possess little or no influence, he recommends the use of kefir (1½ litre during the day) as lessening it in a marked manner.—Jour. Chem. Soc., 1892, lxi. (Abstr.), 226; from Zeits. physiol. Chem., 1892, 20–46.

*Milk—Analysis.*—E. Gottlieb has devised the following quite expeditious method:

Into a cylinder, about 40 cm. high, and graduated into ½ c.c., are introduced 10 gm. of milk. The weighing is done in a small bottle kept for that purpose, in which the adhering film of milk is easily determined, since this film will practically be uniform each time. To the milk in the cylinder there are added, first, 1 c.c. of 10 per cent. ammonia, the mixture being shaken; next 10 c.c. of 95 per cent. alcohol, shaking again; and finally 25 c.c. of ether. After closing the cylinder with a smooth cork, previously dampened, the cylinder is shaken (with up and down strokes), when the fat will readily dissolve in the ether. Next 15 c.c. of petroleum benzin are added, the contents once more shaken, and the cylinder then set aside for six hours, so that the contents may separate in well-defined layers, the upper one being a solution of the fat in ether and benzin, and the lower one a transparent, clear solution of casein and milk sugar, while the phosphates form a white sediment at the bottom. The volume of the upper layer is read off, and a definite portion is syphoned off into a small tared flask. After evaporating the ether and benzin at a gentle heat, the flask is finally heated in a drying oven for two hours at 100° C., cooled in a desiccator, and the residue weighed. The fat must, of course, be perfectly clear, and free from the odor of benzin. By a simple calculation the total amount of fat in the 10 gm. of sample is found.—Am. Drug., 1892, 131, from Landw. Vers.-Stat., lx., 1.

——— Leffmann and Beam modify Babcock's method by treating 15 c.c. of the milk with 3 c.c. of a mixture of equal parts of hydrochloric acid and fusel oil, then 15 c.c. of concentrated sulphuric acid are added, and the mixture boiled. Centrifuge, etc., as usual.—Chem. Zeitg., 1892, 506, from Soc. Publ. Analysts.

——— According to the annual report of the Connecticut Agric. Exp. Stat., 1891, Babcock's method is the most reliable and the most rapid. A definite volume of the milk is introduced into a flask, provided with a narrow, graduated neck, and a certain amount of concentrated sulphuric acid added which dissolves all solid substances excepting the fat. The flask being placed in a centrifuge, the fatty particles will in a few minutes be collected on the surface; on adding sufficient hot water the fat rises in the neck, and the percentage can then easily be read.—Chem. Zeitg., 1892, 483.

——— Frank T. Shutt has investigated the merits of Babcock's method, and compared the results with those obtained in gravimetric analysis. The greatest difference found was a quarter of 1 p. c., the usual variations being between one-tenth and two-tenths of 1 p. c. He therefore concludes that the test, if made according to the instructions given with the machine, will give strictly reliable results. Babcock's method has for its principle the holding in solution of the solids, other than fat, by means of sulphuric acid, the fat at the same time separating as an oily layer, which latter by

the addition of water and the aid of centrifugal motion is brought into the graduated neck of the vessel, and its amount noted.—Chem. News, July 3, 1891, 3.

——— Lézé and Allard estimate the butter as follows: Into a flask of about 150 c.c. capacity, and provided with a long and narrow neck which is graduated into c.c. and subdivisions, are introduced 30 c.c. of the milk to be examined, and 100 c.c. of pure hydrochloric acid, absolutely free from chlorine. After one to two hours, with occasional agitation, the flask is filled up with sufficient warm water to allow all the fatty matter to rise in the neck; after heating to 40° C., the number of c.c. is noted, and multiplied with 0.9, which will give the weight of the fatty matter in 30 c.c. of milk. The authors have used this method also for the estimation of fat in cheese. By digestion with ether a certain cheese was shown to contain 31.84 of fat, while the above method showed 31.75; a very close approximation. Hydrochloric acid dissolves casein; if the acid contains chlorine, the fluid in the flask will be covered with a persistent scum, which renders the correct reading of the volume impossible.—Schweiz. Woch., 1892, 13, Journ. Pharm. Chim.

——— C. Besana proposes to estimate the fat by counting the fat-globules under the microscope.—Chem. Zeitg., July 1891, xv., 961.

*Milk—Preservation.*—A. W. Stokes states that 1 part of boric acid to 1000 parts of milk keeps it fresh for forty hours longer than when nothing is added. Boiling the milk, however, appears to be as efficacious as the use of any preservative.—Chem. and Drug., July 11, 1891, 51, from the Analyst.

*Milk—Preservation.*—The process of Neuhauss, Gronwald and Oehlmann (Berlin) appears the best yet devised. The bottle employed is peculiar, being shoulderless and fitted with a porcelain and rubber stopper, which is attached to the bottle by two wires, much in the same way as the most of the beer and soda water bottles are, pressure on one of the wires pulling the stopper "home." In sterilizing the milk, the bottles are filled, and placed in wire baskets, and then in a chamber where jets of steam bring the temperature up to blood heat. The baskets are now transferred to a large square copper, which has a lid that fits securely to it. This is lowered, clamped, and steam turned on, and in a few minutes a thermometer indicates 100° C. as the temperature of the contents of the bottles. At this it is kept for twenty-five minutes, which experience has proved to be more than enough to completely sterilize the milk.

Steam is cut off now, and by an ingenious arrangement a number of cross-bars within the lid of the copper are actuated from the outside so as to press down the springs of the stoppers, so that the bottles are closed before the copper is opened. It will be seen, therefore, that there is no possibility for any microbic life to survive the steaming, nor can a germ

get into the milk again until it reaches the consumer and the bottle is opened.

Milk for steamers is also sterilized in tin vessels, from which it is run into sterilized cans after the prescribed time. Even in these cans the milk keeps its sweetness for many months.—Am. Drug., Aug. 1891, 234; from Chem. Centralblatt, 1891, 1082.

*Milk—Detection of Boric Acid and Borax.*—According to J. O. Jordan the turmeric test is best applied as follows: Evaporate a few drops of the milk with an equal quantity of freshly prepared tincture of turmeric in a porcelain capsule, then draw a glass rod, moistened with a drop of dilute hydrochloric acid, over the residue, and dry again, when, if either of the two substances is present, a color ranging from light-pink to dark-red will be produced. For confirmation add a drop of ammonia with a glass rod, when a green or greenish-blue color will appear.—Pharm. Record, 1891, xii., 107.

*Milk—Sterilization.*—W. Mendelson gives explicit directions for sterilizing milk with Arnold's steam sterilizer, which the readers can consult in the Western Druggist, 1891, 297.

*Milk—Influence of the Sterilization.*—Blackader sums up the changes which milk undergoes on sterilizing as follows: (1) The starch-liquefying ferment which exists in cow's milk in minute quantities is destroyed when the heat rises above 165° F. (2) A portion of the lactalbumen is coagulated. (3) The casein, after the action of prolonged heat, is less readily coagulated by rennet, and yields slowly and imperfectly to the action of pepsin and pancreatin. (4) The fat globules are injuriously affected by the heat. On churning the unsterilized milk yields more butter and in less time than the sterilized. (5) Milk sugar, by long continued heating, is completely destroyed. Raw milk swarms with bacteria, frequently of the varieties which produce poisonous products.—Am. Journ. Pharm., 1892, 151, from Arch. Pediatrics, 1892, 67.

*Milk—Effect of Sterilization.*—A. R. Leeds states that raising the temperature to the boiling point, and still more the retaining of it at that point for a lengthened period, as in sterilization, converts a considerable portion of the soluble into insoluble proteids. The effect of heat is greatest on the galactozymose—the ferment found in raw milk, which has the power of liquefying starch; even raising milk for a moment to the boiling point destroys this ferment action.

Experiments made to contrast the behavior of sterilized milk with raw milk, when subjected to the action of rennet, acid, artificial gastric juice and pancreatic juice, show that the casein, while not coagulated by the heat, is nevertheless less readily coagulated by rennet, and yields slowly to the action of pepsin and pancreatin. Moreover, a part of the lactalbumen of the milk is coagulated, although only partially so. Its effect, however, is

to thicken the milk and intensify its collodial (ropy or mucilaginous) character. The fat globules are likewise somewhat affected by the heat, and the coagulated proteid matters attach themselves to the fat globules, and probably have an influence in bringing about the difficulty with which the fat is assimilated.

Finally, milk sugar, Dr. Leeds finds, is completely destroyed by long-continued heating, and is probably affected to a certain extent during the interval ordinarily allowed for sterilization. Dr. Leeds thus shows that sterilized milk is less readily and less perfectly digestible than raw milk; and, if sterile milk is sought for, the present desideratum is to obtain it either directly from the animal or by a process not accompanied by such serious drawbacks.

If sterilized milk is desired, Dr. Leeds recommends that, after being rendered feebly alkaline with lime water, the milk should be heated to 155° F. for six minutes; or, still better, the treatment, in alkaline solution, with pancreatin at 155°, followed, if not immediately used, by momentary heating to the boiling point. Either of these procedures, Dr. Leeds maintains, will render milk sterile without detracting from its digestibility.—Am. Drug., Aug. 1891, 255, from Am. Journ. Med. Sci., June; Am. Journ. Pharm., 1891, 445.

*Milk—Acidity.*—W. Thoerner determines the acidity by diluting 10 c.c. of well-shaken milk to 30 c.c., adding a few drops of an alcoholic solution of phenolphthalein, and titrating with decinormal potassa, added drop by drop, until the milk retains after shaking a distinct, though faint, red color. The number of one-tenth c.c. necessary is the "acid number" of the milk. The author found that milk with an acid number below 20 does not coagulate on being heated or boiled; in practice therefore milk is tested by adding to 10 c.c., diluted to 30 c.c., exactly 2 c.c. of decinormal potassa; if the red color caused by phenolphthalein begins to appear, though faintly, the milk can safely be heated to boiling without fear of its curdling; if the milk, however, continues to decolorize, its acid number is higher than 20, and it will curdle on heating.—Chem. Zeitg., 1891, 1108.

*Milk—Analysis of Woman's.*—H. Wartha analyzed the milk of 25 women, ranging in age from 18 to 40 years, with the following results:

| | Mean. | Minimum. | Maximum. |
|---|---|---|---|
| Specific gravity | 1.03276 | 1.02903 | 2.03633 |
| Fat | 33.5 | 10.00 | 48.90 |
| Lactose | 70.05 | 3.20 | 75.70 |
| Albuminoids | 17.96 | 12.60 | 22.30 |
| Ash | 2.01 | 1.40 | 2.80 |
| Water | 876.13 | 862.20 | 971.90 |

—Am. Journ. Pharm., 1892, 28, from Ann. di Chim. e Farm., 1891, 179.

*Woman's Milk—Artificial.*—T. Maltbye Clague, after several trials, worked out the following formula for use in the house, and which any intelligent cook can easily use: New milk, 3¾ pints (60 ounces); cream, ¼ pint (4 ounces); milk sugar, 3¼ ounces; water, 2½ pints (40 ounces). Dissolve the milk sugar in the water, and mix with the other articles; then put into bottles filled to the shoulder only, place them on the tray of a fish kettle, surround with water and place on the fire. Allow the water to boil for half an hour, so that the expansion of the milk may be fairly complete, then cork and allow the boiling to continue for another half hour, when the operation is complete. Analysis of this milk showed:

| | Artificial milk. | Woman's milk. |
|---|---|---|
| Casein | 2.6 | 2.7 |
| Butter | 3.4 | 3.5 |
| Milk sugar | 4.8 | 5.0 |
| Ash | .4 | .2 |
| Water | 88.8 | 88.6 |

On comparison with cow's milk, it was found that submitted to the action of rennet, the curd of cow's milk consisted of one large clot, while in the other two it was much broken up.—Pharm. Jour. Trans., Feb. 1892, 651.

*Citric Acid—Presence in Milk.*—Th. Henkel confirms the presence of citric acid as a normal constituent of cow's milk (see also Proceedings 1889, xxxvii., 675), and thinks that this is characteristic of the milk from herbivora. A. Scheibe, however, shows that human milk always contains it (0.54 to 0.57 gm. in the litre), and that apparently the kind of food has no influence, neither on the presence nor on the relative quantity of the acid.—Chem. Zeitg. (Rep.), 1891, 197, from Landw. Ver. Stat., 1891, 153.

The source of the citric acid in milk has not been discovered as yet. It does not appear to be derived from the citric acid present in the fodder, as it also occurs, though in smaller quantity, in human milk. Whether the fodder contains little or much citric acid, or none at all, does apparently not influence the quantity excreted. Milk secreted in a state of hunger contains the normal amount of the acid. It is certainly not derived from the cellulose undergoing digestion in the intestines.—Am. Drug., 1892, 8, from the Analyst.

*Aerated Milk—Determination of Air.*—H. Joshua Phillips.—Chem. News, July 31, 1891, 53.

### DIGESTIVE FERMENTS.

*Gastric Juice—Estimation of Free Hydrochloric Acid.*—Graffenberger recommends the method of Sjoequist as modified by Jaksch. The gastric juice is strained, neutralized with barium carbonate (which must be absolutely free from chlorine), evaporated to dryness on a water-bath, and calcined by careful ignition. The organic salts of barium are converted into

carbonate, while the chloride remains unaltered; extract the latter with water, and estimate as sulphate.—Chem. Zeitg. (Rep.), 1891, 197; from Pharm. Zeitg., 1891, 392.

*Gastric Juice—Estimation of Hydrochloric Acid.*—According to J. Luettke, the following solutions are necessary: decinormal silver solution in 25 per cent. hydrochloric acid, decinormal solution of ammonium sulphocyanide, and as indicator solution of ferric sulphate (Ph. Germ.).

*Estimation of Total Chlorine.*—The unfiltered gastric juice is well shaken, and 10 c.c. poured into a flask of 100 c.c. capacity; to this is added 20 c.c. of the acid decinormal silver solution, the whole well shaken, and allowed to stand for five minutes. If the gastric juice should be strongly colored, it must be decolorized by the addition of 5 to 10 drops of potassium permanganate solution. Next, about 1 c.c. of the ferric sulphate solution is added, water up to 100 c.c., the whole well shaken, and then filtered through a dry filter into a dry flask. 50 c.c. of the filtrate are titrated with decinormal ammonium sulphocyanide solution, and the total chlorine is calculated by multiplying the c.c. of the sulphocyanide solution with 2, and subtracting the product from the 20 c.c. of silver solution.

*Estimation of the Combined Chlorine.*—Ten c.c. of the well-shaken, unfiltered gastric juice are evaporated in a platinum dish to dryness, and the residue incinerated. Extract with 100 c.c. of warm water, and add to the filtrate 10 c.c. of the acid decinormal silver solution and 1 c.c. of the ferric sulphate solution, titrating with ammonium sulphocyanide, as above. The *free hydrochloric acid* is calculated from the difference between both estimations.—Chem. Zeitg. (Rep.), 1891, 343, from Apoth. Zeitg., 1891, 681.

*Gastric Juice—Estimation of Free Hydrochloric Acid.*—A. F. Jolles and Wallenstein have devised an apparatus which will enable the physician to determine in a few minutes whether the gastric juice contains no free hydrochloric acid, only traces of it, the normal quantity, or an excess. It is based on the difference in shade and color produced by hydrochloric acid upon "brilliant-green," varying according to the proportion present. The apparatus consists of a flat bottle with parallel sides, five small slabs of differently colored glass, a solution of "brilliant-green" (0.1 per cent.), funnel, filters, etc. 10.5 c.c. of the filtered, colorless gastric juice are introduced into the flat bottle, and mixed with 0.5 c.c. of the color-solution; two of the slabs, the color of which come the nearest to that observed, are placed one on each side, and the colors compared against a white paper. As each of the slabs is marked with the percentage of hydrochloric acid which would give that particular shade, the amount of acid in the gastric juice can easily be approximately calculated. It will be necessary to compare the colors at once, because they will change within three to four minutes. The colors run from bluish-green to the yellow of olive oil. Even large

quantities of organic acid act very little on the color.—Pharm. Post, 1891, 445.

*Pepsin—Preparation.*—J. L. Webber has patented the following method: Animal stomachs are macerated with acidulated water, the solution clarified by the addition of sulphurous acid, the clear liquid removed from the precipitate, and then the pepsin separated from the peptone, by saturating at a higher temperature with sodium sulphate, whereupon pepsin is deposited, whilst the peptone remains dissolved. The precipitate is dissolved in weak hydrochloric acid; the sodium sulphate is removed from the solution by dialysis, the residual liquid concentrated and dried. From the liquid out of which the pepsin is deposited, the sodium sulphate is separated from the peptone by recrystallization on cooling. The product is readily soluble and, being free from peptone, is non-hygroscopic and permanent. It is claimed that one grain of it is capable of dissolving ten thousand grains of egg albumen, according to the test of the National Formulary.—Am. Journ. Pharm., 1891, 423, from Ph. Centralh., June 1891.

*Pepsin.*—L. E. Sayre states that the precipitated pepsin is generally considered superior to the scale pepsins. What militates against the use of scale pepsins, is their notorious hygroscopic nature, and their instability, and the fact of their being often disagreeably odorous.

It is surprising how long the lining of the stomach continues to yield pepsin by precipitation. The mucous lining from one stomach was dissected and macerated in sufficient acidulated water to cover the finely chopped lining, leaving about a quart of menstruum in the superstratum. After forty-eight hours the liquid was strained off, precipitated, and washed as usual; then it was dried and tested. This process was repeated twelve times with the same lining. The last precipitate was dense, but the digestive power quite weak. It is, therefore, best not to continue the successive macerations too long; after the third maceration the strength begins to diminish in a marked degree.—Apothecary, Feb. 1892, 9.

*Pepsin—Testing.*—Clark states that in testing pepsin preparations the aim should be to ascertain what quantity is required to completely digest a given weight of albumen in a given quantity of water, and not what weight of albumen will be digested by a given quantity of the preparation in an excessive quantity of water. In the first method the strength of the peptone solution is always the same; the retarding effect of an excessive quantity of peptone must be carefully avoided. In the second method the amount of acidulated water used is the important factor; as no limit can be given to that amount, the digestive power of the same pepsin will always vary to that extent. So long as each experimenter uses some special method of his own, so long will we continue to have different results with the same samples.—Pharm. Journ. Trans., Jan. 1892, 597.

*Pepsin.*—Hirsch and Schneider, in their Commentary on the German Pharmacopœia, point out, what has been noticed by other observers too, that the test should take into consideration not only the solution of the albumen, but also its conversion into peptone. Hence the addition of nitric acid, drop by drop, should not cause more than a faint opalescence; hemi-albumose, which is the intermediary product, yields a copious precipitate, while peptone yields none. They also subscribe to Geissler's view that it would be more correct to find out how much albumen has been dissolved in a given time, instead of ascertaining how much time is necessary to dissolve the whole of the added albumen. Geissler's method is as follows: Place an egg for ten minutes in boiling water, and rub it after cooling through a No. 12 sieve. Mix 10 gm. of this comminuted albumen (or a larger quantity, at all events more than can be dissolved) with 100 c.c. of warm water at a temperature of 50° C., and 10 drops of hydrochloric acid, and then add 0.1 gm. of the pepsin. Digest during three hours, when the 0.1 gm. of pepsin should have dissolved an amount of coagulated albumen corresponding to 1 gm. of dry albumen. On filtering off 10 c.c. of the liquid, warming it during ten hours at 40° C., and then adding 1 c.c. of nitric acid in drops, not more than a faint opalescence should be produced. One hundred parts of albumen usually contain from 12.9 to 14.6 parts of dry albumen.—Am. Drug., 1892, 43.

*Pepsin Solutions—Filtering.*—W. H. Wearn hastens the filtration of pepsin solutions by triturating the pepsin with sugar of milk, before adding it to the liquid.—Pharm. Record. (Sugar of milk here acts evidently mechanically, and any other gritty powder will do as well. - Rep.)

*Pepsin—Effect of Boric Acid.*—Opinions about the harmlessness or harmfulness of boric acid have been much divided; Leffmann and Beam asserting that the acid has practically no influence on the diastatic action of malt extract, and presumably also upon that of the saliva; and Gorup-Besanez that a solution of borax, whilst without influence upon non-organized ferments, renders organized ones inactive. Otto Hehner subjected pepsin to the action of boric acid, and found that the presence of even 3 gm. of the acid had no retarding influence upon the action of 0.34 pepsin (2.500 strength) on 50 gm. of hard-boiled white of egg.—Am. Drug., Aug. 1891, 237, from Analyst, 1891, 126.

*Pepsin—Action of Sodium Chloride.*—A Stutzer has investigated the influence of NaCl on the activity of pepsin: Will pepsin dissolve as much albumen when NaCl is present as when it is absent; and has it a specific action on pepsin, or on the hydrochloric acid, or on both? The solutions employed were: (1) Water; (2) water and sodium chloride; (3) water and hydrochloric acid; (4) water, sodium chloride and hydrochloric acid; (5) acidified gastric juice; (6) sodium chloride. The material acted upon was cotton-seed meal soaked in chloroform water, the temperature 40° C., the time thirty minutes.

68

Results: Salt alone has no appreciable action. Hydrochloric acid, even in 0.05 per cent. solution, has a very considerable solvent power, provided NaCl be present to the extent of only 0.25 per cent. Increase of NaCl means decrease of solvent action; increase of acid to 0.2 per cent. with small amount of NaCl, 0.25 per cent., is accompanied by increase of solvent power; but 1 per cent. of NaCl hinders the action of the acid. One per cent. of NaCl causes pepsin to dissolve more albumen than 0.25 or 0.5 per cent. of NaCl in the presence of acid. Pepsin solutions with NaCl added are capable of dissolving more albumen than when NaCl is absent; the most advantageous conditions under which NaCl acts are when 0.05 or 0.1 per cent. of hydrochloric acid is present.—Yearbook Pharm., 1891, 112, from Journ. Chem. Soc., 1891, 752.

*Pepsin Preparations.*—See under *Pharmacy.*

*Bismuth with Pepsin.*—These two substances, generally considered incompatible, inasmuch as bismuth requires an alkaline medium and pepsin an acid medium, can be administered simultaneously, with benefit, by the following formula, due to H. F. Meyer:

| | |
|---|---|
| Scaled pepsin | 64 grains. |
| Water | 2 fl.ozs. |
| Insoluble bismuth citrate | 128 grains. |
| Glycerin | 2 fl.ozs. |
| Hydrochloric acid | 30 minims. |

Dissolve the pepsin in the water and acid. Triturate the bismuth thoroughly, at first alone, and afterwards with the glycerin, until finely suspended; then mix the two liquids. A "shake-well" label is indispensable.—Western Druggist, 1892, 141, from Pacific Druggist.

*Pine-apple Pepsin.*—The Mosquera-Julia Food Co. has patented a new vegetable pepsin prepared from the juice of pine-apples, which is strained, evaporated in vacuo at a temperature not to exceed 45° C., dialyzed, and the ferment precipitated by sodium chloride. The precipitate is dissolved and scaled. This pepsin is soluble in water without the addition of acids, has a faintly acidulous taste, and peptonizes albumen. It appears to be identical with bromelin. The juice of pine-apples may, however, be used as it is to assist digestion. On mixing 4 kgm. of lean, finely chopped meat with 450 c.c. of strained pine-apple juice (previously diluted with 450 c.c. of water), and exposing the mixture for 3 to 4 hours to a temperature of 45° to 50° C., stirring frequently, the albuminoids will have peptonized. Dissolve the mass in warm water, and evaporate to extract consistence or to dryness, at a temperature not exceeding 60° C.—Pharm. Centralh., 1891, 446.

*Digestive Ferments—Influence of Temperature.*—Digestive ferments require for their efficient action a certain temperature, which is a little over that of the body (39°–40° C.); higher temperatures destroy the ferment,

and E. Biernacki has undertaken to determine the temperature necessary for this latter purpose.

The first ferment investigated was trypsin, and it was found that 45° C. markedly lessens its activity, and exposure for five minutes to 50° destroys it altogether. The specimens of trypsin employed were some pure, some impure, and certain exceptions to the above stated rule were noted. It being very improbable that various trypsins differ in this particular, in virtue of their inherent characters, experiments were instituted to determine the factor that caused the difference. It was found that small admixtures with certain salts had the power of increasing the resistance of the ferment to temperature; the activity of the ferment was often lessened by the salt (although this was more marked in the case of pepsin), but the *optimum* temperature was 50°; 55° lessened, and 60° destroyed, the activity of the ferment. The salts which acted thus were ammonium sulphate (a salt used in the preparation of some specimens of ferment used in the preliminary experiments), ammonium chloride, phosphate and nitrate, and sodium chloride. If mixtures of two or more of these salts were used, the effect was more marked still.

Certain salts (ammonium carbonate and oxalate, magnesium sulphate, sodium sulphate and phosphate), starch and sugar had no such action, but certain products of proteolytic activity (albumose, amphopeptone and antipeptone) act like the salts just enumerated. All the materials that act in this way increase the alkalinity of the digesting medium; minute doses of sodium hydroxide act in a precisely similar way, and the proposition is advanced that the whole of the phenomena are simply dependent on the reaction. Increase of alkalinity protects the ferment. It was found that increase of acidity (trypsin will act in an acid medium if salicylic acid be employed) acts in exactly the opposite way; in an acid medium, 33°–35° is the *optimum* temperature; 40° hinders, and 45° destroys the action of the ferment.

Pepsin was then investigated, and it was found that acidity acts towards this ferment precisely like alkalinity towards the tryptic ferment, the temperature necessary to destroy its activity rising from 65° to 70°. In a neutral medium, the temperature falls to 55°.

Unfiltered fresh saliva loses its diastatic properties at 75°, filtered saliva at 70°, diluted saliva at 60°, pure ptyalin at 70°, unless its solution is much diluted, when the necessary temperature sinks to 60°. The influence of salts, reaction, etc., is exactly the same in kind as with trypsin. In all cases, if the pure ferment be used, the influence of temperature and the influence of salts, etc., on the temperature are more easily observed than if the ferment be impure, as contained, for instance, in the digestive juice.

The explanation of these occurrences probably lies in the formation of loose compounds with the enzymes, analogous to the pepsinhydrochloric acid of Schmidt and other authors.—Am. Jour. Pharm., 1892, 87, from Jour. Chem. Soc., 1891, 1271.

*Peptone—Detection in Urine,* see under *Urine.*

*Peptonization—By Acids.*—L. G. Crismer calls attention to the power of diluted acids to peptonize fibrin at higher temperatures, which by its cheapness, rapidity and simplicity might find industrial application.—Chem. Zeitg. (Rep.), 1891, 196, from Bull. Chim. Belge, 1891, 46.

*Commercial Peptones—Comparison.*—Van de Velde has examined three peptones, viz.: Cornelis, Kemmerich, and Denaeyer's, with the following results:

| | Cornelis. | Kemmerich. | Denaeyer. | |
|---|---|---|---|---|
| Precipitated by alcohol. | gm. 35.886 | 47.567 | 68.9 | Albumin, gelatin, albuminose and peptone. |
| Soluble in alcohol. | 58.936 | 43.333 | 19.43 | Extractive principles almost 20 per cent.; decomposition products of gelatin and albumin. |
| Ash. | 5.178 | 9.1 | 11.67 | Incineration of A. |
| Albumose and peptone. | 15.121 | Peptone absent. | 61.118 | Determined with corrosive sublimate in the solution of A (gelatin not being precipitated). |

—Am. Journ. Pharm., 1892, 138, from Ann. Soc. med. d'Anvers, 1891.

*Peptones—Estimation.*—A. Denaeyer estimates the commercial peptones by precipitating the concentrated solution with strong alcohol; the precipitate containing the undigested albumen, albumoses, peptone, and gelatin, whilst the solution contains all decomposition products of the albuminoids (leucin, tyrosin, etc.) and of the gelatin (alanin, glycocoll, etc.). The larger the precipitate, the more valuable the peptone. The method of examination is very simple:

Two gm. of the dry peptone (or an equivalent quantity of the pasty or fluid peptones, which latter, of course, need not be dissolved) are dissolved, or triturated, in a little water, not exceeding 10 c.c., poured into 100 gm. of absolute alcohol, and allowed to stand for twenty-four hours in a cool place. The clear solution is poured off, the precipitate washed with alcohol, the alcohol distilled off, and the residue evaporated to dryness first on a water-bath, and then in a drying oven. The alcoholic precipitate is also dried. Properly made peptone should not contain over 30 per cent. of alcohol-soluble extractive matter; some of the commercial meat-peptones contain up to 60 per cent.—Chem. Zeitg. (Rep.), 1891, 355, from Journ. Pharm. d' Anvers, 1891, 405.

*Peptones—Analysis.*—It is well known that in the digestion of meat by acid pepsin several compounds are obtained, which, although similar in

composition, are by no means identical in chemical properties or nutritive value. The substances to be determined may, for analytical purposes, be classified as follows:

(1) Water; ash; total nitrogen. (2) Matters extracted by absolute alcohol. Definite compounds for the most part; some nitrogenous, some non-nitrogenous. It has been shown by M. Denaeyer that one variety of gelatin present in peptones is soluble in alcohol. (3) Albumins: coagulated and rendered permanently insoluble by heat or by strong alcohol. (4) Albumoses: not coagulated by heat. Soluble in water. Precipitated by alcohol, cupric hydrate, phospho-tungstic acid, mercuric chloride and ammonium sulphate. (5) Peptones: not coagulated by heat. Soluble in water. Precipitated by alcohol, phospho-tungstic acid and mercuric chloride, but not by cupric hydrate or ammonium sulphate. (6) Gelatins: partly soluble in alcohol. Precipitated entirely and in all forms by phospho-tungstic acid and ammonium sulphate. Not precipitated by cupric hydrate or mercuric chloride.

The nitrogen in the proteids varies from 14.4 per cent. in chondrin to over 18 per cent. in gelatin (Beilstein, iii., 1292–1294). C. W. Heaton and S. A. Vasey have assumed 15.8 per cent. of nitrogen, which gives as a factor to be applied to the nitrogen 6.33.

Before giving their improved method of analysis, the authors give a short review of the methods hitherto proposed.

(1) *A. Stutzer.* Meat preparations are digested with pepsin in the usual manner; in the undissolved residue nitrogen is determined by soda-lime. The fluid is then agitated with cupric hydrate, suspended in weak glycerin, which, if the fluid be not too acid, throws down albumose. The separation appears to be complete, and the liquid filters well. In the cupric precipitate nitrogen is determined by soda-lime. The cupric mixture can be prepared as follows:

100 grams of crystallized cupric sulphate are dissolved in 5 litres of water and 2.5 grams of glycerin added. The solution is then made alkaline with caustic soda, and filtered. The precipitate is well mixed with a large excess of water containing 5 grams of glycerin per litre. All traces of alkali are now completely removed by decantation, and, if necessary, by filtration, the same glycerin solution being used throughout. The precipitate is then made up to 1 litre with water containing 10 per cent. of glycerin. The thin emulsion then contains nearly 40 grammes per litre of cupric hydrate, and can easily be transferred by a pipette. It may conveniently be described as Stutzer's reagent.

(2) *Kuehne and Chittenden.*—See Proceedings 1887, xxxv., 368.

(3) *Koenig and Kisch.*—See Proceedings 1890, xxxviii., 719.

(4 and 5) *A. Denaeyer.*—See Proceediugs 1891, xxxix., 665.

(6) *A. Denaeyer.*—Short method, see above, p. 1076.

(7) *The Modified Process of C. W. Heaton and S. A. Vasey.*—It is convenient to work with a tolerably concentrated solution. Any portion insoluble in warm, but not boiling water, may be removed by filtration, and treated separately for nitrogen, etc. If a jelly be under examination it must be liquefied by heat or by dilution. In the following synopsis a strength of about 20 per cent. of solid matter is assumed. It is obvious that in any such scheme of analysis the mineral salts must be included among the organic proximate constituents, for our knowledge does not yet permit us to assign to albumose, peptone, and the like, any definite proportion of mineral compounds. It is best to make separate estimations of water, ash, and total nitrogen.

(1) *Water; ash; total nitrogen.*—Estimated as usual. About 3 grams for water and ash, and about 1 gram for total nitrogen, by the Kjeldahl method, are convenient quantities.

(2) *Albumin; gelatin insoluble in alcohol (coagulable gelatin); albumose; peptone.*—40 grams of fluid peptone containing about 80 per cent. of water are dropped gradually into 300 c.c. of nearly anhydrous alcohol, in a large weighed beaker, and the mixture agitated by gentle centrifugal motion. After an hour or so the above-named compounds will have separated, and can be washed with absolute alcohol by decantation. The alcoholic solution is preserved for further treatment, and is hereafter alluded to as the *stock alcoholic solution.* The beaker, with its contents, is then dried to constant weight at 100° C.

(*a*) *Albumin.*—The weighed alcoholic precipitate is digested with warm water and washed on a tared filter. The residue, which has been rendered insoluble by the alcohol, is weighed as albumin.

The filtrate from albumin is diluted with water to 250 c.c. This may be described as the *stock aqueous solution.*

(*b*) *Albumose and gelatin.*—25 c.c. of stock aqueous solution are evaporated to a few c.c., treated with saturated solution of ammonium sulphate, raised to nearly 100°, and quickly cooled with centrifugal agitation. The ppt. is thrown on a tared filter, washed with ammonium sulphate, dried, and weighed. In the ppt. the excess of ammonium sulphate is afterwards estimated gravimetrically by barium chloride and deducted.

(*c*) *Albumose.*—50 c.c. of stock aqueous solution are raised to near 100° C., and are then treated with 30 c.c. of Stutzer's reagent. The ppt. is washed in a filter with hot water, and the nitrogen contained in it estimated by the Kjeldahl method. 30 c.c. $H_2SO_4$ and a globule of mercury give good results.

(*d*) *Gelatin.*—It is evident that from the results of the last two operations both gelatin and peptone may be found by difference. A direct estimation of gelatin may be made as follows: The filtrate from the copper ppt. is concentrated to a few c.c. in a beaker previously weighed with a

glass rod; saturated solution of ammonium sulphate is then added, the mixture raised nearly to the boiling point, and then quickly cooled with centrifugal agitation. As M. Denaeyer has shown, the gelatin now separates, and adheres to the sides and bottom of the beaker, particularly if touched from time to time with the rod. The gelatin may now be once washed rapidly with the ice-cold water, dried and weighed, and the ammonium sulphate retained in it estimated and deducted as before.

(3) With regard to the alcoholic extract which we have described as the stock alcoholic solution, we confirm M. Denaeyer's statement that the dried extract is too hygroscopic to permit any accurate inference to be drawn from its weight. It is better to adopt the following method, which is in substantial agreement with that recommended by M. Denaeyer. The stock alcoholic solution is made up to a definite volume, say to 500 c.c. This is divided into fractions for separate treatment.

(*a*) *Gelatin Soluble in Alcohol.*—One fraction, say one-fifth, is evaporated to dryness, taken up with warm water and treated with ammonium sulphate in the manner already described.

(*b*) *Urea, etc.*—Another fraction, one-tenth, may be evaporated to dryness and treated with sodium hypobromite. But evidently the nitrogen could not with any accuracy be calculated as urea.

(*c*) *Nitrogen.*—Another fraction, one-fifth, may be evaporated and treated by the Kjeldahl method for nitrogen. After deducting the nitrogen present as soluble gelatin, the residue multiplied by 3.12 gives the creatin-equivalent of crystallizable nitrogenous compounds.

(*d*) *Ash in Alcohol Extractive.*—Another fraction may be used for the determination of ash.

The following analysis of a sample of beef-peptone prepared by M. Denaeyer will serve to illustrate the system.

The peptone was a semi-solid jelly, liquefied by gentle heat. It was sterile and bright, and was free from bitterness. It tasted like beef-tea, and mixed easily with water.

I.

| | |
|---|---|
| Organic matters | 15.59 |
| Mineral matters | 2.43 |
| Water | 81.98 |
| | 100.00 |

II.

| | | |
|---|---|---|
| Albumins coagulated by heat and alcohol | | 0.12 |
| Matters precipitated by alcohol— | | |
| Gelatin (direct weighing) | 2.00 | |
| Albumose (Am. sulphate ppt. *minus* gelatin) | 5.06 | |
| [N. B.—Albumose found by estimation of N. in Cu. ppt., $.79 \times 6.33 = 5.00$]. | | |
| Peptone (difference) | 3.33 | |
| Total (direct weighing) | | 10.39 |

| | | |
|---|---|---|
| Matters not precipitated by alcohol— | | |
| Gelatin soluble in alcohol (direct weighing) | 1.30 | |
| Extractive, etc, (difference) | 6.21 | |
| Total | | 7.51 |
| Water | | 81.98 |
| | | 100.00 |

III.

| | |
|---|---|
| Nitrogen (Kjeldahl)— | |
| Total | 2.67 |
| In alcoholic ppt. | 1.38 |
| In albumose | .79 |
| Liberated by NaBrO | .22 |

—Am. Jour. Pharm., 1892, 154–160.

*Peptones and Proteoses.*—R. H. Chittenden and J. A. Hartwell find from quantitative experiments on artificial gastric digestion, that the primary proteoses (proto- and hetero-) are only slowly converted into peptone, since they pass through the intermediate stage of deutero-proteose. The latter, on the other hand, standing next to peptone, is far more quickly and readily changed. The formation of peptone is thus a gradual process, as the greater part of the peptone formed by the action of pepsin-hydrochloric acid passes through the proteose stage, and at the end of the most vigorous gastric digestion a considerable part of the proteid digested will be in the form of proteose.—Jour. Chem. Soc., Aug. 1891, 953; from J. Physiolog., xii., 12–22.

*Peptonized Foods.*—P. Horton-Smith has analyzed "Benger's peptonized beef jelly," "Darby's fluid meat," and peptonized milk prepared by means of Benger's liquor pancreaticus, and comes to the result that the proteid in the so-called peptonized foods really consists for the most part of proteoses, though containing only a variable amount of true peptone. They cannot, therefore, entirely relieve the digestive organs from work.—Jour. Chem. Soc., Aug. 1891, 953; from J. Physiolog., xii., 42–71.

*Peptone Solution.*—Bernoux recommends the following: Dry peptone, 50 to 100 gm., roasted coffee, 100 to 200 gm., saccharin, 2.5 to 5 gm. Mix. This quantity is digested with sufficient boiling water to make 1 litre of infusion which contains 5, respectively 10, per cent. of peptone. In cases where alcohol is admissible, 5 to 10 per cent. of rum may be added.—Zeits. Oester. Apoth.-Ver., 1892, 222, from Union med.

*Peptonum Siccum.*—German Unoff. Form.

Light-yellow, light, spongy, readily friable pieces, or a whitish powder of a bitter but not repulsive animal taste, almost odorless, soluble in water in all proportions, forming a neutral or faintly acid liquid. The aqueous solution (1 in 20) is light-yellow and clear, or becomes clear by the addition of a small quantity of hydrochloric acid. Alcohol precipitates from it the peptone.

On treating a solution of 1 gm. of peptone in 10 c.c. of water with 10 drops of solution of soda (15 per cent.) and 5 drops of copper sulphate solution (1 in 20), a raspberry-red tint is produced.

The aqueous solution (1 in 20) should not be affected by heat, nor by the addition of nitric acid or solution of soda.—Am. Drug., 1891, 377.

*Ferrum Peptonatum* (German Unoff. Form.)—

| | |
|---|---|
| Albumen, dry | 20 parts. |
| Hydrochloric acid (sp. gr. 1.124) | 33 " |
| Pepsin (Germ. Ph. 1 : 100) | 1 part. |
| Solution of oxychloride of iron (German Ph. "Dialyzed Iron") | 240 parts. |
| Water | a sufficient quantity. |

Dissolve the albumen in 2,000 parts of water, add 30 parts of the hydrochloric acid, and the pepsin, and macerate the mixture during twelve hours at 40° C. Then neutralize it exactly with solution of soda, separate any precipitate which may have formed, and add the solution of oxychloride of iron previously mixed with 2,000 parts of water. Now neutralize exactly with a dilute solution of soda, so as to precipitate the peptonate of iron formed, and wash the latter with water by decantation until the washings are no longer rendered opalescent by silver nitrate. Then collect the precipitate upon a moistened straining cloth, allow it to drain, transfer it to a porcelain capsule, add 3 parts of hydrochloric acid, and warm gently until solution has taken place. Evaporate the liquid on a water or steam bath to a syrupy consistence, spread it on plates of glass, and dry it at a temperature of 50° C. (122° F.)

The product appears in form of shining, brown, transparent laminæ or scales containing 24 to 25 per cent. of metallic iron. It is slowly soluble in cold, more rapidly in warm water, to a clear, faintly acid liquid, which is not rendered turbid either by boiling or by alcohol. On slowly heating 10 c.c. of a solution (1 in 20) of peptonate of iron with 2 c.c. of hydrochloric acid to boiling, the liquid at first becomes turbid, then separates flakes, which finally dissolve.

*Estimation of Iron.*—Dissolve 0.5 gm. of peptonate of iron in 20 c.c. of hot water, heat with 10 c.c. of diluted sulphuric acid until the matter first separated is redissolved, dilute with 200 c.c. of hot water, add an excess of ammonia, and heat on a water bath until the precipitate has entirely separated and the liquid portion appears colorless. Collect the precipitate upon a filter, wash it with hot water until the filtrate is no longer rendered turbid by barium nitrate, and dissolve it off the filter by dropping upon the latter hot, diluted sulphuric acid. Dilute the solution with water to 100 c.c. [in a measuring cylinder], add 3 gm. of potassium iodide, and allow the cylinder to stand, well stoppered, for half an hour at a temperature not exceeding 40° C. Then cool, and titrate the liberated iodine by sodium hyposulphite volumetric solution, of which 21.4 to 22.3 should be required.—Am. Drug., 1891, 365.

*Artocarp-Papayotin.*—Theodor Peckolt has isolated the peculiar papayotin of the "bread fruit" (fruit of Artocarpus incisa). The expressed juice from the grated unripe fruit is filtered, and precipitated by absolute alcohol. The precipitate is dissolved in a little water, and precipitated by subacetate of lead, and freed from the lead by hydrogen sulphide.

The filtrate is heated gently to dissipate the odor of hydrogen sulphide, precipitated by absolute alcohol, and dried over calcium chloride. It is a grayish-white powder, easily soluble in water, and dissolves albumen, but not so rapidly as the papayotin obtained from the milk juice of the fruit.

Papayotin from the milk juice is obtained by shaking the milk with four times its volume of distilled water, filter, and precipitate by absolute alcohol. The precipitate is dissolved in a little water, and re-precipitated by absolute alcohol; finally it is dried over calcium chloride. It is a grayish-white powder, not soluble in water (? Rep.), and dissolves albumen, but at 50° C., and not in the cold, as papayotin.—Pharm. Rundschau, N. Y., 1891, 221.

*Pancreatic Juice—Influence of Bile on the Fat-splitting Properties*—B. K. Rachford has investigated the emulsions in general and the action of bile on pancreatic emulsions in particular, and has arrived at the following results: No amount of stirring will give a permanent emulsion of neutral olive oil with either distilled water or 0.25 per cent. sodium carbonate solution; rancid olive oil, however, although it gives no emulsion with water, gives a good one with the alkaline solution. In the formation of an emulsion, not only must the oil be broken into fine globules, but these must be prevented from running together, by a coating of soap or mucilaginous material. No mechanical emulsion, however, is as perfect as a physiological one. Bile prevents the formation of an emulsion, probably by preventing the formation of soap membranes; if bile be added to an emulsion the moment after it is formed, the emulsion clears; but if a few minutes elapse before the addition of bile, there is no such clearing, the emulsion having become stable. Acids destroy emulsions, probably by destroying soaps. If rabbits' pancreatic juice (which is alkaline, and remains active for many hours) be shaken with neutral olive oil, fatty acids are formed and the oil becomes acid: if too much acid has not formed, admixture of sodium carbonate solution leads to the formation of an emulsion. By one to two hours action of the juice, all the oil is hydrolyzed with formation of fatty acid and glycerol. Other fats, excepting castor oil, which is indigestible, are similarly acted upon. Bile alone does not hydrolyze fats, but it considerably hastens the hydrolytic power of pancreatic juice. Rachford finally sums up as follows:

(1) Pancreatic juice alone will do a certain piece of work in $x$ minutes: namely, develop in neutral olive oil a sufficient quantity of fatty acid to give the best spontaneous emulsion. (2) The juice in the presence of

five parts of 0.25 sodium carbonate solution will require $8x$ minutes to do the same work, and the presence of ten parts of the solution will destroy the action. (3) The juice in the presence of an equal amount of 0.25 per cent. hydrochloric acid will require $\frac{3x}{2}$ minutes to do the same work. (4) The juice in the presence of an equal amount of a mixture of bile and 0.25 per cent. hydrochloric acid will require only $\frac{x}{4}$ minutes. The last mentioned condition is considered analogous to the natural condition of things in the intestine, and thus it appears that the most favorable circumstances are present in the intestine for the carrying out of fat digestion.—Journ. Chem. Soc., Aug. 1891, 948, from J. Physiolog., xii., 72–94.

*Diastatic Enzyme in Plants.*—J. Wortmann argues against the invariable presence of a diastatic ferment in plants essential to the decomposition of starch. He maintains that not only can starch be absorbed without the assistance of diastase, but that diastase may occur when it can have no function in connection with the absorption of starch.

The presence of starch is demonstrated by extracting the thoroughly crushed plant in question with an equal volume of water for two or three hours in the cold, unless where large quantities of starch, mucilage or albuminoids are present, when the extraction must last longer. The presence of starch is then shown by its action on starch. He finds that in reserve receptacles where large quantities of starch are stored up, such as seeds, tubers and rhizomes, diastase is also present in considerable quantities, while it is not found in assimilating leaves, although much starch is present.—Botanische Zeitung, through Pharm. Jour. and Trans., July 11, 1891, 30.

*Food—Necessary Amount.*—Dr. Studemund kept 47 soldiers for 92 days on a dietary containing 113.0 gm. of albumen, 54.3 gm. of fat, and 551.8 gm. of carbohydrates. Of these, 34 men gained on an average 38 gm. per day. This shows that the above amount and proportions are not only sufficient to live on, but also to gain in weight.—D.-A. Apoth. Zeitg., Aug. 1891, 82, from Arch. f. Physiologie.

*Meat—Fresh and Frozen.*—According to Maljean, fresh meat can be distinguished from meat preserved by freezing by examining a little of the juice (or blood) taken from the centre of the piece of meat, under the microscope. The blood corpuscles from fresh meat possess their normal appearance and float in a colorless serum. Frozen blood shows most of its corpuscles more or less distorted and nearly colorless, while the surrounding fluid has a comparatively darker coloration. The transfer of the blood or juice from the meat to the slide must be done rapidly to prevent its drying.—Chem. Zeitg., Rep., 1892, 133, from Jour. Pharm. Chim., 1892, xxv., 348.

*Creatin and Creatinin.*—G. S. Johnson finds as the result of his studies that meat contains creatinin, but that creatin is due to the action of bacteria.—Chem. News, 1891, lxiii., 265.

*Fibrine.*—A. Béchamp maintains that fibrine is not a proximate principle, but a mixture formed by a special albuminoid matter inclosing microzymes of a peculiar kind.—Chem. News, July 31, 1891, 61, from Bull. Soc. Chimique, v., N. 10.

*Gelatin—Digestion.*—R. H. Chittenden and F. P. Solley have investigated the products of digestion of gelatin, the composition of which is: C, 49.38; H, 6.81; N, 17.97; S, 0.71; O, 25.13; ash, 1.26. They find that three distinct products are formed; two of these are primary, and are formed both in gastric and pancreatic digestion; they are distinguished from the third product, gelatin peptone, by being precipitated by saturation with ammonium sulphate. The proto-gelatose is converted into deutero-gelatose by further ferment action and ultimately into peptone. Proto-gelatose differs from deutero-gelatose, by being partially precipitated by saturating its neutral solution with sodium chloride, and completely by the addition of a little acetic acid to the saturated fluid; further, it yields a heavy precipitate with hydrogen platinochloride.—Journ. Chem. Soc., Aug., 1891, 949, from J. Physiolog., xii., 23–33.

*Saliva—Reaction.*—A. H. Allen states that saliva is neutral to litmus, acid to phenolphthalein, and alkaline to methyl-orange, which shows that it contains a weak acid.—Chem. Drug., Jan. 1892, 104.

*Fermentation—Chemistry.*—Armstrong, in a series of articles, covers the whole ground of the present state of our knowledge of the chemistry of fermentation, for which reference must be had to Pharm. Journ. Trans., Dec. 1891, 495, Jan., Feb., March 1892, 597, 659, 757.

*Putrefaction—Detection.*—F. J. Wulling bases his test for incipient putrefaction on the fact that one of the first products is free ammonia. He holds a glass rod, dipped in hydrochloric acid, over the body or substance, when white fumes of ammonium chloride will show themselves. It is, of course, necessary that the atmosphere be free from ammonia, which easily can be seen on taking the glass rod out of the acid.—Pharm. Record, 1892, xiii., 135.

*Yeast—Purification.*—J. Effront recommends to destroy the bacteria in yeast and wort by the addition of fluorides (30 to 50 mgm. to 100 c.c.) The spores are more resistant, and require larger doses, which, however, do not interfere with the ulterior activity of the yeast.—Chem. News, 1892, lxv., 25, from Bull. Soc. Chim., 1891, vi.

*Yeast—Action on Typhoid Bacilli.*—Bavay has lately carried on a series of experiments with the following results: Typhoid bacilli growing in an alkaline medium are much more virulent than when grown in an acid medium. He explains this on the assumption that the poison secreted by

the organism is immediately precipitated in the alkaline medium, leaving the bacillus free to act, whilst in an acid medium the poison is not precipitated, and eventually accumulates to such a degree that the organism which secretes it is itself poisoned. He found, also, that if he dissolved the sediment from an alkaline solution in a weak acid, he obtained an exceedingly poisonous substance. From this he argues that yeast, as it passes through the intestines comparatively unchanged, and as it develops a considerable quantity of acid in its growth, should, if introduced into the intestinal canal, maintain a certain acidity in the contents, and so prevent storing up of the typhoid poison. His conclusions are: (1) That the action of yeast in the treatment of typhoid fever is principally due to the power which it has of secreting an acid, and of doing this over and over again, by which means it is able to render acid the contents of the intestines. (2) That when such an acid exists, the poison secreted by the germ reacts upon the germs themselves and stops their growth. (3) That the action of yeast on the poison of typhoid differs according to whether it is pure or contaminated with bacteria. (4) That liquids impregnated with yeast are in a great measure protected against the depredations of typhoid bacilli, especially if such a liquid contains a fermentable sugar. (5) That these properties of yeast are not confined to one variety, but that they increase or diminish according to the power of assimilation and acid secretion of different varieties.—Drug. Circ., 1892, 9, from Brit. Med. Journ.

*Tuberculin—Preparation.*—Dr. Koch gives the following information: It is generally understood that tuberculin is a product of the cultivation of tubercle bacilli obtained in the form of a glycerin extract. As may be supposed, a principal difficulty has been the cultivation of the bacilli free from admixture with other organisms. Originally the tubercle bacilli were sown upon "glycerin-peptone-agar," and when the culture had attained its full development it was washed off, collected on a fine wire gauze, extracted with a 4 per cent. glycerin solution, the solution evaporated to one-tenth, filtered, and the filtrate used. When a large demand arose for tuberculin, the agar cultivation was found unsuitable, as it gave relatively small results. A previously abandoned attempt to cultivate the bacilli in a liquid medium was therefore resumed, but at first without success, until some small flat pieces of cultivation which had been left dry and unmoistened in the upper part of the flask, were observed swimming on the top of the liquid, where they developed most luxuriantly. In the course of a few weeks they formed over the entire surface a tolerably thick whitish skin, dry on the upper side, which eventually became moistened, broke up and sank to the bottom. The product from such a culture proved considerably greater than that developed on solid media. The cultivation liquid used is an infusion of veal made faintly alkaline, and with 1 per cent. of peptone and 4 or 5 per cent. of glycerin added. The bacilli sown give

practically the same results, whether taken from fresh or old cultivations, from a tuberculous patient, or after passing through a series of animals. When the culture is quite mature, which occurs at the end of six or eight weeks, and has been ascertained to be absolutely pure, it is extracted by means of the cultivation liquid itself, and the extract is evaporated on a water bath to one-tenth of its original volume and filtered through porcelain. It then contains from 40 to 50 per cent. of glycerin, and is tested as to its activity by experiments upon guinea pigs.—Am. Jour. Pharm., 1891, 604; from Pharm. Jour. and Trans., Oct. 1891, 345. (Deutsche Med. Woch. 1891, 1189.)

*Tuberculin* is stated to be a glycerin extract of a pure cultivation of the tubercle bacillus, and in the opinion of Dr. Koch, the therapeutic value is due to one active principle that is present to the extent of only a fraction of 1 p. c. Dr. William Hunter, on investigation, finds that the characteristic symptoms following the injection of tuberculin, are due to at least three constituents, and that it may be possible, by modifying the mode of its preparation so as to eliminate one or the other of these constituents, to exercise more control over the effects produced. Preliminary experiments upon the composition of tuberculin led to the conclusion that its principal constituents are albumoses, alkaloidal substances, extractives of unrecognized nature, mucin, inorganic salts, glycerin, coloring matter. Tuberculin was treated with absolute alcohol, and the precipitate, consisting chiefly of albumoses, removed by filtration; this was named provisionally "A." The filtrate from "A" was evaporated at a temperature not exceeding 40° C., and the residue taken up in half per cent. solution of carbolic acid. This solution, "C," contains the constituents of tuberculin but in reverse proportion to "A." When tested clinically, it was found that both caused absorption and disappearance of tuberculous tissue, with this difference, that the use of "A" was attended by decided local inflammatory reaction, though with little or no fever, while with "C" there was little or no inflammation, but high fever. Apparently the fever is connected with the salts in tuberculin. Modification "B" was therefore prepared by precipitating the whole of the albumoses by means of ammonium sulphate, and removing the precipitant by dialysis. The product, obtained in this way was found to possess in an eminent degree the power of inducing local reaction, followed by healing changes around tuberculous lesions, unaccompanied by any constitutional disturbance whatever. By submitting filtrate from "A" to dialysis, a product was obtained which induced very distinct local improvement, unattended with fever or scarcely any noticeable inflammatory reaction.—Pharm. Journ. and Trans., Aug. 1, 1891, 82, from Brit. Med. Jour., July 25, 1892, 169.

*Tuberculin in the Dairy.*—The veterinary college in Philadelphia has found that tuberculin is of great value in diagnosing tuberculous disease in cows long before the usual signs indicate it.—Am. Drug., 1891, 345.

*Tuberculin.*—The "Medicinische Presse" compresses the history of tuberculin as follows: Drama in four acts; Heureka, Vici, Ave morituri te salutant, De mortuis nil nisi bonum; Epilogue, Fuit!

*Tuberculin—Purification.*—Hoffmann gives the results of several processes for the purification of tuberculin. The crude tuberculin (1 gm.) is slowly dropped into 20 gms. absolute alcohol, and the white precipitate coagulated by addition of 0.1 gm. sodium chloride dissolved in 1 gm. water; after 24 hours it separates as a yellowish-brown resinous mass, which is rinsed three times with alcohol (99 per cent.) and then dissolved in 2 gms. water; this solution reprecipitated by addition of 40 gms. absolute alcohol, and sufficient tartaric acid added to impart a slight acid reaction (all alkaloidal tartrates being soluble in alcohol, this procedure was adopted to remove alkaloids from the tuberculin); after 24 hours the clear supernatant liquid was decanted and the precipitate washed three times with alcohol; by dissolving in water and evaporating in a desiccator, a white amorphous powder was obtained (9 per cent. of the tuberculin taken), which dissolved clear in water after adding a small quantity of sodium carbonate. This product marked A was compared with the purified product of Klebs B (see Tuberculoidin), also with the crude tuberculin C towards reagents. All three show the biuret test, and are precipitated by picric acid and ferric acetate; C gives more decided precipitates than either A or B with phospho-molybdic acid, tannin and mercuric chloride; C gives precipitates not obtainable with A and B with potassium tri-iodide, platinic chloride and Mayer's reagent; with Millon's reagent A and B form whitish flakes, becoming yellow on warming; C gives the same precipitate, and in addition a supernatant liquid that becomes cherry-red after warming. In all cases where differences were noticed between the crude and purified tuberculin, the examination of the alcoholic mother-liquors disclosed the substance causing the difference.—Am. Jour. Pharm., 1892, 24; from Pharm. Zeit., 1891, 741.

*Tuberculocidinum.*—This is the name given by Prof. Klebs, Zurich, to a purified *tuberculin*; the impurities to be removed are *organic bases* or *alkaloids*, which are the cause of the intense febrile reaction. The method followed in its preparation is precipitating the tuberculin with alcohol, dissolving in water, and extracting the alkaloids by agitation with chloroform (Pictet) or benzol (crystallized); a more recent process depends upon the precipitation of the alkaloids (no reagent or precipitant is mentioned. F. X. M.), and extracting the tuberculocidinum from this precipitate with water; by this process its properties, such as being precipitated by absolute alcohol and ammonium sulphate, also its physiological action, and its behavior towards albuminoidal reagents, are not impaired. The use of this substance is harmless; it does not produce fever, and speedily shows an improvement in the condition of the patients; the hectic fever and night-sweats disappear, the appetite increases, the catarrhal process in the lungs,

with its symptoms, cough and expectoration, is noticeably arrested, the bacilli in the expectoration become granular and the portions capable of absorbing dyes become smaller and smaller, and finally disappear entirely. In some thirty patients treated, no objectionable symptoms could be discovered; to thoroughly test its action, a number of physicians have been supplied with the remedy.—Am. Journ. Pharm., 1891, 599, from Pharm. Zeitg., 1891, 700.

*Tuberculinic Acid.*—E. Bombelon thinks that the active principle of the crude tuberculin is an acid, and proposes the following method for obtaining it: Precipitate 5 c.c. of the lymph with 20 c.c. ether-alcohol (what proportion of ether and alcohol?). The precipitate is dissolved in 5 c.c. of water, 1 c.c. of liquefied carbolic acid (P. G.) is added, the whole well-shaken, and allowed to stand for eight days. The bottom layer is a yellow oil on top of which floats a layer of powder. The supernatant liquid is syphoned off (this liquid is stated to contain the noxious substance, which is precipitated by alcohol but not by carbolic acid); and the oily layer is treated with ether-alcohol (equal parts of ether and absolute alcohol) which takes up the carbolic acid, precipitating the tuberculinic acid, which is washed with a little cold water and dried. It forms a loose, white powder, easily soluble in solution of sodium carbonate, forming what Bombelon calls: "sodium tuberculinate." Whether this purified tuberculin possesses any activity remains to be seen.—Pharm. Post, 1891, 977, from Pharm. Zeitg., 1891, 714.

*Bacillus Denitrificans.*—E. Gitlay and J. H. Aberson have discovered a new bacillus which decomposes all the nitrate in a nutritive fluid containing asparagine and nitrates, but does not form nitrite, and gives off only nitrogen. In these respects it differs from the *bacterium denitrificans* $\alpha$ and $\beta$ of Gayon and Dupetit. The alpha bacterium entirely decomposes the nitrate without the formation of nitrous acid, and gives as products gaseous nitrogen and monoxide of nitrogen; while the beta bacterium leaves much of the nitrate undecomposed, always gives nitrite, and only gives nitrogen as a gaseous product.—Pharm. Journ. Trans., Feb. 1891, 691, from Arch. Neerl.

*Bacillus Tuberculosis—Detection.*—The saliva (sputum) of consumption in the first stage generally contains few bacilli, which are quite difficult to discover. Dr. Dotsmen recommends to heat the sputum for about 15 minutes by placing the test tube into boiling water; after cooling and a gentle shaking (rotatory) all the solid substances present will be deposited, carrying with them the micro-organisms. The supernatant opalescent liquid is poured off, the crumbling, cheesy deposit is triturated in a glass mortar, and then prepared for examination as usual.—Sueddeutsche Apoth. Zeitg., 1892, 2, from Correspond.-Blatt. Schweiz. Aerzte.

*Bacillus Tuberculosis—Staining.*—In the usual methods of staining the

preparation is decolorized by means of acids. As it at times may be preferable to avoid the use of acids, Ritsert takes advantage of the avidity of fusel oil for aniline colors, as follows: After air-drying the preparation (on the cover glass), and moving it three times through a flame, as usual, the preparation is covered with (Ziel's) fuchsin solution, and heated to boiling over a small flame. The cover-glass is next rinsed in a small quantity of water, and then moved back and forth in a solution of fusel oil in alcohol (1 : 10), until the preparation appears deprived of color. After dipping it for a few moments into alcohol, to get rid of the fusel oil, it is stained in the usual way with an alcoholic solution of methylene blue. The tubercle bacilli appear red, while the other bacilli and cocci appear blue. —Sueddeutsche Apoth.-Zeitg., 1892, 10.

*Bacilli of Consumption.*—According to the calculations of Dr. Nattall, the saliva expectorated by consumptives within 24 hours, varies from 250-000 to 4 milliards (that is four million millions).—Zeits. Oesterr. Apoth.-Ver., 1892, 236.

*Bacillus Tuberculosis.*—It would appear from experiments on dogs made by Hericourt and Richet, that the micro-organism of bird-tuberculosis is inimical to that of human-tuberculosis.—Pharm. Journ. Trans., April 1892, 890, from Lancet.

*Bacteriology.*—A good resumé of the history and the present state of our knowledge of this subject, by J. Leffingwell Hatch, will be found in Pharm. Journ. Trans., Oct. 1891, 271, 289, 330; from Annual Rep. Phil. Coll. Pharm.

*Bacterial Poisons.*—W. Simon has an instructive article on the chemical examination of products resulting from bacteria, which is not suited for intelligent abstraction.—Pharm. Review, 1892, 31, 44, 61, 90.

*Bacteria and Hydrogen Sulphide.*—Petri and Maassen have shown that bacteria of disease are able to generate hydrogen sulphide. This might possibly give a valuable hint in the treatment of infectious diseases.—Pharm. Post, 1892, 582.

*Saliva—Action upon Bacteria.*—Sanarelli has investigated the action of saliva upon the growth of the micro-organisms most often found in the mouth. He finds it possesses bacteria-killing properties, chiefly dependent upon the number of micro-organisms introduced into it. The Staphylococcus aureus, Streptococcus pyogenes, Micrococcus tetragenus, and the typhoid and cholera bacilli, perish if in small quantities. The diphtheria bacillus ceased to thrive, and the Pneumococcus lost its virulence. —Pharm. Journ. Trans., April 1892, 890; from Centralbl. Bakt. Paras.

*Bacteria in Milk—Staining.*—As it is often desirable to stain bacteria in milk or other fat-containing media, without going to the tedious trouble of removing the fatty matter, Arens advises to use alcohol-soluble aniline stains with chloroform. One drop of milk, diluted with one drop of water,

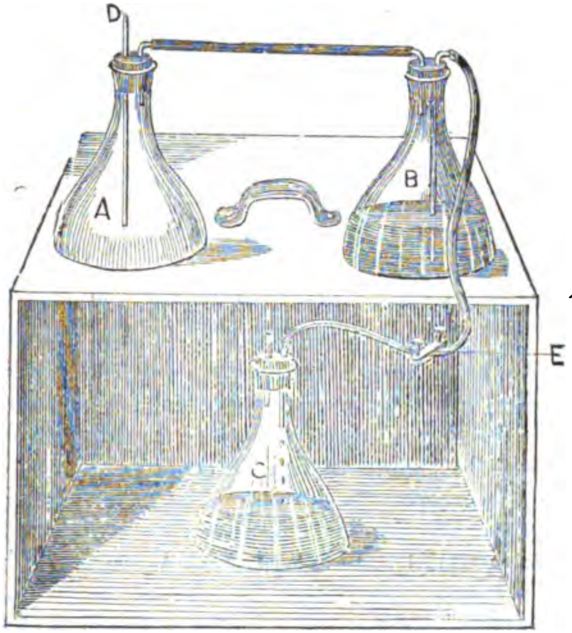
is dried on a cover glass, and "fixed" by heating the cover, but not too strongly. The cover is next transferred to "chloroform-methylene-blue" (12 to 15 drops of a saturated alcoholic solution of methylene-blue, to which has been added 3 to 4 c.c. of chloroform); after 4 to 6 minutes, according to the thickness of the film, the cover is removed, the chloroform allowed to evaporate spontaneously, and the excess of coloring matter removed by rinsing in water. With fresh milk only the bacteria are stained dark-blue; if the milk has curdled, however, or become sour, the casein particles will be found stained pale-blue, which will not interfere with the visibility of the dark-stained bacteria.—Microscopical Bulletin, 1892, 21; from Centralb. Bacterienkunde, 1891.

*Bacterium Amylozymicus.*—L. Perdrix has separated from Paris water a bacillus, *B. amylozymicus*, which ferments starch, with production of amyl alcohol. It is separated by cultivation on potatoes, and finally on gelatin. The bacillus is 2–3 $\mu$ long, and 0.5 $\mu$ thick; the rods are joined in pairs and chains, and in the absence of oxygen are motile, like *Vibrio butyricus*, Pasteur. The rods are readily stained; the spores are set free through the dissolution of the walls of the mother cell. The bacillus flourishes only in the absence of oxygen, readily, however, either in a vacuum or in hydrogen, nitrogen, or carbonic anhydride. The optimum temperature is 35°; it grows quite well at 20–25°; at 16–17°, fermentation commences at the end of four days. Its "maximum" temperature is 42–43°. It will grow in all the usual cultivating media, ferments the sugars and starch, but does not attack cellulose or calcium lactate, differing in this respect from *Vibrio butyricus*, Pasteur. Acids are produced during the fermentations which it causes, and the presence of acidity, equivalent to 0.055 gram sulphuric anhydride, or of alkali equivalent to 0.08–0.11 gram in 100 c.c., is sufficient to arrest the process; the addition of calcium carbonate to the liquid enables the fermentation to become perfect. Glucose ferments to hydrogen, carbonic anhydride, acetic and butyric acids during the first three days; from the third to the ninth day no acid is formed. From saccharose and lactose acetic acid is formed during the first five days. From the fermentation of starch a distillate was obtained, of which one-third was amyl alcohol, and from 100 grams of potatoes, 2.3–2.5 c.c. of alcohols were separated. The sugar obtained from starch is very similar to glucose, but has a less rotatory action, and its phenylglucosazone melts 10° lower than that from glucose; 94 per cent. of the starch is converted into sugar, carbonic anhydride, ethyl and amyl alcohols, acetic and butyric acids, and 6 per cent. is converted into dextrin. The sugar formed by the bacillus from starch may be fermented perfectly with beer-yeast, either after sterilization, or in the presence of the bacillus. If either the sugar obtained by fermentation of starch with this bacillus, or a sterilized mash, be fermented with a pure cultivation of yeast, no fusel oil is formed, and the author concludes that the fusel oil found in commercially prepared

alcohol, is formed by the action of bacteria. The *B. amylozymicus* remains uninjured for 10 days at 50–55°.—Am. Journ. Pharm., 1892, 152, from Journ. Chem. Soc., 1892, 90.

*Microbes in the Air.*—E. W. Lucas gives a sketch of the apparatus, which consists of three flasks (say half gallon, flat bottomed). One, A, to act as the air receiver, the second, B, is filled with water and connected with the

FIG. 20.




first, while the third, C, is connected by a syphon with the second, to receive its contents. Flask A is prepared by careful sterilization, then 20 c.cm. nutrient gelatin is introduced and the mouth plugged with sterile cotton, after which it is heated in a steam sterilizer for a half hour on three successive days. A two-hole rubber cork which has been previously sterilized and fitted with one tube reaching nearly to the bottom and its top end drawn to a fine point and sealed, the other fitted with a tube bent at right angles at each end to connect flasks A and B. The flask B is filled with water and connected by a syphon with flask C, which stands on a lower level. When ready for work the upper end of glass tube in flask A is broken off to leave a small orifice, and the syphon arranged so that water will fall by drops into C, so that fresh air enters A slowly. When the water flask has emptied itself, flask A is disconnected and rubber caps placed over the tubes and the flask set aside to allow the colonies of microbes to develop.—Pharm. Journ. Trans., July 1891, 63.

BILE AND URINE WITH CONSTITUENTS.

*Chemistry of the Liver.*—A. P. Luff has read a paper on this subject before the Chemists' Assistants' Association, which is an excellent resumé of the whole subject, but contains nothing especially new, and cannot well be condensed. Reference must be had to Pharm. Jour. and Trans., April 1892, 884, or Am. Jour. Pharm., 1892, 322–328.

*Bile—Influence of Purgatives.*—Loewenstein found that large doses of aloes, rhubarb, cathartic acid, jalap, gamboge and podophyllotoxin do not increase the biliary secretion; on the contrary, the last two drugs lessen it. Absence of bile in the intestines lessens the purgative effects of gamboge, jalap and podophyllotoxin, and increases the action of rhubarb and aloes. —Am. Jour. Pharm., 1892, 288, from Bull. Therap., 1891.

*Influence on the Action of Pancreatin.*—See under *Pancreatin.*

*Bile—Detection in Urine.*—See under *Urine.*

URINE.

*Urine—Testing.*—Louis Siebold calls attention to several points often overlooked.

*Albumen.*—In incipient cases of albuminuria and Bright's disease, the urine collected the first thing in the morning is occasionally quite free from albumen, though portions collected later on may contain appreciable quantities. After the administration of acids the urine fails to respond to some of the tests. The nitric acid test is the least delicate test; in every case where this test appears to indicate albumen, while the heat test and the potassium ferrocyanide (with acetic acid) test give negative results, the nitric acid indication should be regarded with distrust. After the administration of balsams the urine reacts with nitric acid as an albuminous urine; the resinous precipitate, however, is soluble in alcohol and in excess of nitric acid. The heat-test should be performed with a filtered urine, and a test-tube with unboiled urine should always be used for comparison. The same precaution should be observed in applying the ferrocyanide test. The several tests Siebold arranges in the following order: The most delicate being picric acid, then potassio-mercuric iodide, ferrocyanide, heat, cold nitric acid, and last Jolles' bleaching-powder test.

*Bile.*—Siebold considers Rosenbach's test the most reliable: Filter the urine through white filtering paper, and let a drop of concentrated nitric acid run down the side of the still moist filter. It leaves a yellow streak which soon turns orange, with a violet border, outside of which blue and emerald-green zones will be observed.

*Blood.*—He recommends as a chemical test that of Luchini: Shake the urine with chloroform and one drop of acetic acid, when the presence of blood may be deduced from the color imparted to the chloroform.

*Sugar.*—The best way in which to test for sugar is the following: Heat

two fluid drachms of Fehling's solution in a test tube to boiling, and add 5 to 10 drops of urine; if the sugar be abundant the well-known deposit will be observed. Traces of sugar are detected by adding 1½ fluid drachms of the urine to the hot solution, heating again to boiling, and allow it to stand for some time. If no milkiness is produced as the mixture cools, the urine is either free from sugar, or it contains less than $\frac{1}{40}$ per cent. If the quantity of sugar is very small, the mixture loses its transparency, and passes from clear greenish-blue to a light greenish opacity, as if a few drops of milk had been added.

*Quantitative Examination.*—Quantitative analysis of samples of urine not representative of the whole day's discharge are in the majority of cases of but little practical value.—Chem. Drug., Jan. 1892, 105.

*Urine—Test for Albumen in Presence of Biliary Matter (Icteric Urine).*—Grocco finds that the usual reagents for albumen in icteric urine at times produce a precipitate similar to coagulated albumen, but being soluble in alcohol, and not giving the biuret reaction. To avoid being misled, it is necessary to treat the urine with $\frac{1}{20}$ or $\frac{1}{30}$ of its volume of concentrated acetic acid, and put it aside for six to eight hours at a low temperature; it is then filtered, and the usual albumen tests applied. The author finds this pseudo-albuminous precipitate to be composed of biliary pigments, principally biliverdin.—Am. Journ. Pharm., 1892, 316, from Rep. Pharm., 1892, 168.

*Urine—Estimation of Albumen.*—Jolles considers the acetic acid potassium ferrocyanide test as the most delicate, especially if the urine be filtered before applying the test, and the mixture compared with the clear urine; in this manner it will be possible to detect albumen even if present in traces amounting to only 0.0008 gm. per 100 c.c. Bacterial urine cannot be rendered clear by filtration, but must be shaken up with a little infusorial earth, when a clear filtrate can be obtained. Traces of albumen, adhering to the earth, can be removed by washing the earth with a warm solution of potassa.—Year-book Pharm., 1891, 119, from Zeits. analyt. Chem., xxix., 407.

*Urine—Test for Albumen.*—E. Spiegler states that the following reagent is more sensitive than potassium ferrocyanide with acetic acid. The reagent consists of a solution of 8.0 mercuric chloride, 4.0 tartaric acid, 20.0 sugar in 200.0 water (all in gm.)

A test-tube is filled to about one-third or one-half with the reagent, and the previously filtered urine, to which has been added a little concentrated acetic acid, is added slowly, drop by drop, so as to form a layer on top of the reagent. Spiegler states that less than 1 : 50,000 of albumen can be detected in this way by the formation of a white ring in the line of contact. The addition of acetic acid is made to prevent the formation of mercuric carbonate.—Zeits. Oesterr. Apoth.-Ver., 1892, 65, from Wien. klin. Woch.-S., 1891.

*Urine—Optical Estimation of Albumin.*—H. O. C. Ellinger has recently found that albumin may be estimated by Jean's oleorefractometer.

The apparatus consists of a tube, having a telescope at one end and a lens at the other, which is placed in front of the source of light. In the centre of the instrument is a reservoir confined between two glass plates, and within this reservoir is a removable prism with glass sides. If both the reservoir and the prism are filled with the same liquid, the observer looking through the telescope will find, upon a photographically reduced scale contained inside of the tube, a shadow, the perpendicular line of which coincides with the mark 0. If the two liquids differ optically, the shadow will begin at a different mark. In some cases it will be to the left, in others to the right of zero. According as the case may be, there is an arrangement by which the observation may be easily made in either case.

Ellinger has found that if urine containing albumin is deprived of the latter by heating, addition of a drop of dilute acetic acid, and filtration, a portion of the filtrate then introduced into the central reservoir of the instrument, and some of the unboiled but filtered urine introduced into the prisms, the shadow will be pushed to the right in proportion to the amount of albumin. In five different experiments the author obtained the following readings on the scale:

2.5, 4, 4.5, 5, 5.

By actual analysis the corresponding amounts of albumin in 1,000 parts of the urine were found to be:

2.71, 4.36, 4.94, 5.10, 5.22.

It will be seen, therefore, that the results are sufficiently accurate for clinical purposes.—Am. Drug., 1891, 345; from Jour. f. prakt. Chem., 1891, xliv., 256.

*Urine — Test for Albumen.*— J. A. MacWilliam recommends salicylsulphonic acid as a reliable test. To 20 minims of urine in a very small test tube add a drop or two of a saturated aqueous solution of the acid (if the urine is strongly alkaline, an extra drop or two of the solution should be added). Shake the tube quickly, and examine at once. The appearance of an opalescence or cloudiness immediately or within a very few seconds is a test for proteids (if the opalescence occurs first in a couple of minutes, it indicates traces only of proteid). If on heating to boiling the opalescence or precipitate does not disappear, it is due to albumen; if on the other hand it clears up on heating to reappear on cooling, it is due to albumoses or peptones.—Am. Journ. Med. Sci., July 1891, 192, from Brit. Med. J.; Am. Journ. Pharm. 1891, 446.

——— J. Neumann recommends strongly salicylsulphonic acid as test for albumen, because it can be used in the cold, and is as sensitive a test as any other.—Pharm. Centralh., 1892, 31.

*Urine—Action of Balsams.*—R. Stockman finds that after the administration of Peruvian balsam and storax the urine reacts with nitric acid in a similar manner as if albumen were present, but that the precipitate is soluble both in alcohol and in an excess of nitric acid, and therefore does not consist of albumen. The precipitate is evidently due to the resinous constituents of the balsams.—Year-book Pharm., 1891, 116, from Lab. Rep. Col. Phys., Edinburgh.

*Urine—Test for Bile.*—M. Kathrein adds 5 to 10 drops of tincture of iodine (1 : 10), drop by drop, to 4 or 5 c.c. warm urine; on shaking the urine turns green; an excess of iodine must however be avoided. Normal urine will merely show a red to reddish-brown color.—Zeitschr. analyt. Chemie, 1891, xxx., 527.

*Urine—Test for Bile.*—Jolles considers the tests of Rosenbach (nitric acid and filtering paper) and of Huppert (milk of lime and hydrochloric acid) as the most trustworthy and easy of application. Rosenbach's test may be rendered still more delicate by the employment of nitric acid containing nitrous acid. A drop of this acid, allowed to fall upon filtering paper saturated with urine, and the paper then passed three or four times through a Bunsen flame, the presence of the slightest trace of biliverdin is indicated by the formation of a bright green ring round the nitric acid drop.

The trustworthiness of Huppert's test depends on the proper concentration of the milk of lime employed. Jolles finds that the best results are obtained by shaking 8 to 10 c.c. of the urine with an equal volume of milk of lime containing 20 gm. of CaO in the litre. Upon treatment of the precipitate with alcohol and dilute hydrochloric acid, and boiling the filtrate, the liquid assumes a green or blue coloration if bile-pigments be present. —Year-book Pharm., 1891, 119, from Zeits. analyt. Chem., xxix., 402.

*Urine—Estimation of Chlorides.*—A. Corvi estimates chlorides in urine by a color reaction depending upon the formation of Prussian blue. The solutions required are a decinormal solution of silver nitrate and a decinormal solution of potassium ferrocyanide (weighed in the anhydrous state). One c.c. of the latter corresponds to 0.0108 gm. of silver, or to 0.00355 gm. of chlorine. Ten c.c. of the urine are placed in a beaker, acidulated with nitric acid, and 50 c.c. of the silver solution—more than sufficient to precipitate all the chlorine—then added. The volume of the mixture is now carefully noted, the whole filtered, and one-third of the filtrate taken for the assay. One drop of ferric sulphate solution is now added, and the ferrocyanide solution gradually dropped in from a burette until, after stirring, a blue tint just remains permanent.—Am. Drug., 1892, 44, from Orosi, 1891, xiii., 253.

*Urine—Indigo Red (Indirubin).*—H. Rosin prepared indigo-red artificially from commercial indigo; it was also prepared by a modification

of Berzelius' method from the indican of plants, and also from the urine. The percentage composition, the crystalline form, and other properties, and the relation of the pigments to indigo-blue, were in all cases absolutely identical. The pigments which are identical with indigo-red are Heller's urrhodin, Leube's pathological urinary pigment, and Plosz's urorubin. Those pigments which are not the same as indigo-red are scatole pigment, Nencki and Sieber's urorosein, uroerythrin, urohaematin, Giacose's pigment, and urorubrohaematin.—Journ. Chem. Soc., July 1891, 850, from Virchow's Archiv, cxxiii., 519–566.

*Urine—Detection of Iodine.*—According to A. F. Jolles, about 10 c.c. of the urine are mixed with an equal volume of strong hydrochloric acid, and two or three drops of a weak solution of chlorine are added with a pipette in such a manner that they form a layer on top of the urine. In presence of even very small quantities of iodine, there appears at the surface of contact a yellowish-brown ring, which becomes of an intense blue color after the addition of a solution of starch. The presence of indican does not interfere with this reaction, since the iodine ring appears higher than, and separate from that of indican.—Chem. News, 1891, lxiv., 213; from Zeits. analyt. Chem.

*Urine—Detection of Naphthol.*—E. Desesquelle states that after the external application of naphthol in the form of an ointment, it can be detected in the urine. The urine is evaporated to dryness, the residue dissolved in ether, the filtered ethereal solution again evaporated, and the residue dissolved in chloroform; it is then treated with soda, and afterwards with sulphuric acid, when the green coloration characteristic of naphthol is developed.—Yearbook Pharm., 1891, 117; from Comptes rendus, Soc. Biolog., xi., 101–104.

*Urine—Guaiac Reaction for Pus.*—P. Schoenlaub states that if the reaction is carried out in the following way it never fails to indicate pus, when present. He shakes the urine with 2 to 3 drops of the tincture, heats it to 30°–40° C., and adds another 2 or 3 drops of the tincture, when the blue color will appear.—Schweiz. Woch., 1892, 45.

*Urine—Detection of Salol.*—Lacroix calls attention to the fact that neither the reduction of certain metallic oxides nor the rotatory power can be depended on for the indication of glucose in persons taking salol, since this substance imparts similar properties to the urine. He states that salol and glucose may be distinguished as follows:

(1) After treating the urine with subacetate of lead, a test-tube holding 15 c.c. is half filled with the same; to this is added .05 gm. phenylhydrazin hydrochloride and .2 gm. pure acetate of sodium. The test-tube is then heated to 100° C. (212° F.) on a water-bath for half an hour. The contents are then poured into some water and allowed to cool. The precipitate formed is examined with the microscope. Glucose gives a crystalline precipitate, while the salol compound gives an amorphous one.

(2) 100 c.c. urine are shaken with 1 gm. sulphuric acid and about 50 c.c. pure ether; it is then permitted to separate. The upper layer, containing the derivatives of salol, is evaporated, the residue dissolved in water, and a few drops of perchloride of iron are added to it. This would give rise to a violet color in case salol were present. The lower layer, after separation from the ethereal solution, is treated with subacĕtate of lead, filtered, and the glucose then estimated in the usual manner. - Am. Jour. Pharm., 1891, 555, from Bull. Thérap., 1891, 284.

*Peptone—Detection in Urine and Other Albuminous Liquids.*—Luigi Devoto first coagulates the albumin and nucleo-albumin present by treating the urine (200–300 c.c.) or albuminous liquids (50–100 c.c.) with ammonium sulphate, as described under Albumen. After cooling, the precipitate is thrown on a filter, and washed with hot water. The filtrate is examined for peptone, etc., by the biuret reaction, and also by the use of potassium ferrocyanide and acetic acid. He states that a solution of 30 c.c., containing only 2 mgm. of Witte's peptone, shows the reaction plainly.—Pharm. Rundschau, N. Y., 1891, 222, from Zeits. physiolog. Chem., 1891, 465.

*Urine—Estimation of Sugar.*—H. E. Hoelke boils the urine with excess of Fehling's solution. The cuprous oxide is collected and washed on a filter, then immersed in ferric sulphate, $H_2SO_4$ added, and titred with permanganate (56 units of iron found = 36 glucose):

$$Cu_2O + Fe_2(SO_4)_3 + H_2SO_4 = 2CuSO_4 + 2FeSO_4 + H_2O.$$

The results are quite reliable, if the work is done with ordinary care, and certainly preferable to the tedious methods of spotting for the end reaction.—Am. Drug., 1891, 281.

*Urine—Estimation of Sugar.*—H. Ost states that the following solution of copper-potassium carbonate is superior to Fehling's solution:

23.5 gm. of crystallized copper sulphate, 250 gm. of potassium carbonate, and 100 gm. of potassium carbonate per litre. Its advantages are: (1) It is unchanged by keeping. (2) Its action on cane sugar is comparatively slight. (3) After 10 minutes' boiling the precipitation of cuprous oxide is practically complete, and thus more concordant results are obtained. (4) The monosaccharoses precipitate almost twice as much cuprous oxide from this solution as from Fehling's solution. (5) The quantity of precipitate obtained by different sugars varies considerably, thus rendering it possible to determine the composition of mixtures. The solution may be employed for volumetric as well as gravimetric estimations, as the end reaction is sharp; the time required for boiling is, however, longer than with Fehling's solution. For gravimetric estimations, 50 c.c. are mixed with 25 c.c. of the sugar solution, water is added, and the liquid is boiled for ten minutes, filtered through an asbestos filter, and the

cuprous oxide reduced in a current of hydrogen. This article is accompanied by a table showing the quantity of copper precipitated by different kinds of sugar, from which we select those corresponding to 100 mgm. of copper. Invert-sugar, 29.5 mgm.; dextrose, 30.3; levulose, 28.5; galactose, 34.5; and arabinose, 33.1.—Yearbook Pharm., 1891, 121; from Ber., xxiii., 3003–3011; Journ. Chem. Soc., 1890, 1031.

*Urine—Testing for Sugar.*—In many cases Fehling's solution causes only a yellowish or greenish-yellow separation, which refuses to settle for a long time. J. Seegen proposes to overcome this difficulty as follows: Some 20 to 40 c.c. of the urine are passed through blood-charcoal, and the filtrate poured back until it passes through colorless. Next wash the charcoal with small quantities of distilled water. On applying Fehling's solution to a urine containing only about 0.1 to 0.5 per cent. of sugar, it will be noticed that the unfiltered urine decolorizes the solution, causing a dichroic, greenish-yellow turbidity. The decolorized urine develops a yellowish turbidity; the first wash-water will probably show the same, but the second and third give a clean precipitate of red cuprous oxide. This method may be used quantitatively, but it will be necessary to recollect that the charcoal retains some of the sugar, usually about 10 per cent.—Am. Drug., 1892, 130, from Wien. klin. Wochenschr.

*Urine—Detection of Sugar.*—Rosenbach adds a few drops of soda solution and a saturated solution of sodium nitroprusside, and heats the mixture. If glucose (even as little as $\frac{1}{10}$ per cent.), or other substance reducing Fehling's solution, be present, a deep-brown or orange-red color is developed. The red coloration yielded immediately on the addition of nitroprusside of sodium to alkaline urine, disappears on heating, and the brown-red color caused by the sugar is then apparent. By this treatment urine, containing over $\frac{1}{10}$ per cent. of glucose, does not become turbid, and the reddish-brown color is changed on the addition of acid into a Prussian blue color.—Pharm. Jour. and Trans., June 1892, from Centralbl. klin. Med.

*Urine—Glucose—Fehling's Test*—A. W. Hudson calls attention to a fact which is often overlooked: The urine (or other liquid) must be added while Fehling's solution is boiling in the test-tube, as the glucose only decomposes the copper at the boiling point. If the urine contains albumen it should be boiled and filtered before testing for sugar, otherwise the precipitation of the copper is retarded.—Pharm. Journ. Trans., Dec. 1891, 508.

*Urine—Testing for Sugar.*—In view of the fact that the presence of so many substances prevents or obscures the sugar reaction, G. Vulpius recommends to make a blank experiment with a portion of the same urine, to which a small percentage of glucose has been added. If the latter does not respond to the sugar test, then the presence of substances obscuring

the reaction is established, and some of the other tests for sugar must be tried.

The best way to proceed is: 10 c.c. of diluted Fehling's solution are divided in two test tubes, and heated to boiling; to one of the test-tubes is added ½ c.c. of the urine, diluted with ½ c.c. of water, and to the other is added ½ c.c. of the urine, diluted with ½ c.c. of water, containing 1 per cent. of glucose, and both liquids again heated to boiling. If now the urine, containing glucose, reacts properly, but not the urine to which nothing but water has been added, then the latter does not contain sugar. There are other substances which react similarly to Fehling's solution; it is therefore best, where Fehling's test appears to indicate sugar, to apply other confirmatory tests.—Pharm. Post, 1892, 7.

*Urine—Fehling's Test for Glucose.*—Grimbert found that sometimes the precipitate is of a greenish-yellow color and settles very slowly. In order to determine whether this coloration was due to glucose or to some other substance, he added Fehling's solution to solutions of glucose in pure water and in normal urine, which latter were precipitated with subacetate of lead. The solutions in water gave a purely red precipitate, whilst the solutions in urine gave a more or less greenish-yellow turbidity, showing that urine contains a substance which is not precipitated by subacetate of lead. Grimbert found that the peculiar coloration was due to the presence of creatinin; on adding a solution of extract of meat (1 : 2000) to an aqueous solution of glucose (1 : 1000), Fehling's solution produced a similarly colored turbidity.—Pharm. Post, 1892, 607, from Journ. Pharm. Chim., 1892, 421.

*Urine—Detection of Tannin.*—According to S. Kathrein, the urine is warmed and mixed with 5–10 drops of iodine solution (1 : 10); shaking the urine after each drop of iodine. In the presence of tannin, a beautiful and characteristic green coloration is produced; with excess of iodine, the coloration becomes brownish-red. In the absence of tannin, the iodine is first absorbed, and then a red coloration appears.—Journ. Chem. Soc., Aug. 1891, 964, from Chem. Centralbl., 1891, i., 272.

*Urine—Test for Typhoid Fever.*—Dr. C. E. Simon has shown that sulphanilic acid ("Ehrlich's" test) is a valuable test for the presence of typhoid fever. The test consists of two solutions: (1) A saturated solution of sulphanilic acid in 5 per cent. hydrochloric acid, and (2) a 1 per cent. solution of sodium nitrite. These solutions are to be mixed in the proportion of 40 c.c. of (1) to 1 c.c. of (2). To a few c.c. of urine in a test-tube, add an equal quantity of the sulphanilic acid mixture, and shake thoroughly; then allow 1 c.c. of ammonia to run down the side of the tube. At the junction of the two liquids there will be observed a ring of colors varying from eosine rose to deep garnet-red.—Pharm. Record, 1891, xii., 361, from Am. Practitioner.

*Urine—Odor After Eating Asparagus*.—Nencki distilled the asparagus-urine, previously acidulated with oxalic acid, over a sand-bath, and passed the escaping gases into a wash bottle containing a 3 per cent. solution of mercury cyanide. The gas proved to contain methyl-mercaptan.—Am. Drug., July 1891, 216.

*Urea from Vegetable Albuminoids*.—E. Drechsel discovered not long since that, by boiling casein with hydrochloric acid and stannous chloride, nitrogenous organic compounds of basic character, besides ammonia and amido acids, occur amongst the decomposition products. Two of these bases are "lysatine" $C_6H_{11}N_3O_2$ and "lysine" $C_6H_{14}N_2O_2$. According to Siegfried these two compounds are also obtained from vegetable albumenoids by a similar treatment, and this statement caused Schulze to examine the degradation products of albumenoids occurring in the plant organism during germination. Among other products Schulze found in the seeds of Lupinus luteus "arginine" $C_6H_{14}N_4O_2$. (See Proceedings 1888, xxxvi., 568). After Dreschel had shown that lysatine yielded urea by boiling with baryta water, Schulze and Likiernik applied the same reaction to arginine with like result, 12 gm. of arginine cupric nitrate (6.8 arginine) yielding, after an hour's boiling, 0.9 gm. of urea nitrate.—Pharm. Journ. Trans., Oct. 1891, 269, from Ber., 1891, xxiv., 2701.

*Urea—Estimation*.—Dr. E. R. Squibb published several years ago (in "Ephemeris") a simple method of approximately estimating urea, based —not on the measuring of the evolved nitrogen gas—but on the measuring of the volume of water displaced by the evolved gas; replacing the bromine, etc., by the officinal solution of chlorinated soda; and devising a very simple apparatus. A hitherto unexpected source of error led Dr. Squibb to revise the process. As long as the formula of the U. S. P. of 1870 or 1880 was followed in the preparation of the chlorinated soda solution, no trouble or inaccuracy was noticed, but with the solution prepared according to the U. S. P. of 1890, the method does not give account of the urea present by from 0.75 to 1 per cent. On comparing the different formulas it will be noticed that the former Pharmacopœias directed a large excess of sodium carbonate (24 to 12 of chlorinated lime), which excess in the last Pharmacopœia has been reduced (25 to 20 of chlorinated lime). This excess is very necessary for the complete decomposition of the urea, which accounts for the reliable results obtained with the old solutions.

As to the unavoidable errors, Dr. Squibb calls attention to the fact that all rapid methods which are based on the decomposition of urea and measurement of the evolved nitrogen, afford approximate results only. He states, however, that the general range of error should not be greater than about 0.2 per cent., and seldom will be less than 0.1 per cent., plus or minus.

The apparatus consists essentially of a vial containing a certain quantity

of chlorinated soda solution, into which the 2 c.c. of urine are dropped, another vial, connected with the first by a rubber tubing, and filled with water, and provided with a shorter tubing passing into a graduated jar, for receiving the displaced water. Dr. Squibb describes with his well-known painstaking attention to the minutest details of manipulation the procedure to be employed. The article is accompanied by a table, and by a process for the extemporaneous solution of chlorinated soda.—Ephemeris, April 1892, 1315–1338.

——— Dr. E. R. Squibb endorses Dott's plan for using a solution of chlorinated lime (see Proceedings 1890, xxxviii., 686), but uses his own simple apparatus, described above instead of a nitrometer. The solution is best made by shaking 20 gm. of the chlorinated lime with 60 c.c. of water, and filtering; the filtrate being made up to 100 c.c. with the wash-water. Each 10 c.c. represent 2 gm. of the lime. On trial with 10 samples of chlorinated lime of varying strength (from 18.2 to 38 per cent. of available chlorine), Squibb obtained with a solution containing 2 per cent. of pure urea, results varying from 2.02 to 2.08 per cent.—Ephemeris, April, 1892, 1329.

*Urea—Improved Solutions for the Hypobromite Test.*—Charles Rice, in view of the danger attending the handling of bromine, and the poor keeping quality of the finished test solution, proposes to keep separate the solutions of soda in water and of bromine in water containing potassium bromide.

I. *Soda Solution.*—Dissolve 250 parts of commercial caustic soda in water to make 1,000 parts. Keep it in a bottle with a rubber stopper until it has become perfectly clear, then transfer it to another bottle. In reality, a solution of about the specific gravity 1.250 is wanted, but a moderate deviation downward does no harm. A spec. grav. of 1.250 represents a solution containing about 225 parts of pure soda; as the commercial soda is on an average only 90 per cent. pure, 250 parts correspond to 225 parts pure soda.

II. *Bromine Solution*—

| | |
|---|---|
| Bromine | 125 gm, |
| Potassium bromide | 125 gm. |
| Water, suff. to make | 1000 c.c. |

As the bromine is highly destructive to the balances, and otherwise disagreeable to handle, Rice advises to weigh a bottle containing an approximately convenient quantity, then to empty the contents into an aqueous solution of potassium bromide stronger than required, and to weigh the empty bottle again. This will give the weight of the bromine, and upon this basis is then adjusted the quantity of potassium bromide and water, to correspond with the quantities given above. If this solution be kept

cool, there will be very little inconvenience experienced from the escape of bromine vapors. For use equal volumes of the two solutions are mixed. —Am. Drug., 1892, 77.

——— Dr. E. R. Squibb, for "theoretical" reasons, proposes to use sodium bromide instead of potassium bromide, and formulates the preparation of the hypobromite solution as follows:

Empty a bottle of bromine into a tared bottle, ascertain the weight of the bromine, add an equal weight of sodium bromide and sufficient water until the solution measures as many c.c. as eight times the number of grammes of bromine taken. For the assay take equal volumes of this solution and the above soda solution. The bromine solution contains 0.125 gm. of bromine in each c.c., and the mixed solutions, of course, 0.0625 gm.—Ephemeris, April 1892, 1335.

*Urea—Synthetic.*—The old method by Woehler, by fusing anhydrous ferrocyanide of potassium with dry potassium carbonate and red lead, pouring off the melted mass from the sediment, and digesting it with ammonium sulphate, is about to be superseded by the following process, which depends upon the fact that when ammoniacal gas is passed through a solution of diphenylcarbonate, phenol is separated, and amidogen, $NH_2$, takes the place of the displaced nucleus, forming urea. Any suitable quantity of carbolic acid is dissolved in an equivalent quantity of a dilute solution of soda (94 parts of carbolic acid require 57 parts of soda). Through this solution phosgen gas, or carbonyl chloride ($COCl_2$) is passed, whereby the phenol is converted into diphenyl-carbonate. This is filtered off, and washed with water, melted on a water-bath, and a strong current of dry ammoniacal gas passed through it. As soon as no more ammonia is absorbed, the whole mass is poured into hot water, when on cooling there will be found two layers—a darker one, containing the phenol, and an aqueous, less colored one, of urea. The urea is obtained on evaporation, and purified by treating it with alcohol. Five parts of diphenyl-carbonate yield 1 part of urea.—Am. Drug., 1892, 75.

*Urea (Carbamide)—Preparation.*—J. Volhard prepares it by gradually adding a solution of potassium permanganate (63 gm.) in water (1 litre) to a solution of potassium cyanide (39 gm.) and potassium hydrate (10 gm.) in water (100 c.c.), the temperature being kept below 17° C. The solution is then placed in cold water for seven or eight hours until it becomes colorless, when it is mixed with a concentrated solution of ammonium sulphate (70 gm.) heated to boiling and filtered. The precipitate is washed with boiling water, the filtrate and washings evaporated to dryness, and the carbamide extracted with 95 per cent. alcohol. The yield is 68 per cent. of the theoretical quantity, and contains a little ammonium chloride and traces of the sulphate, from which it can be freed by treating the aqueous solution with barium carbonate, evaporating to dryness, and

extracting with alcohol.—Year-book Pharm., 1891, 28, from Liebig's Annalen, cclix., 377–380.

*Urea—Volatility.*—Léon Bourgeoise found that by heating urea in a vacuum, it sublimes at about 120° C. to 130° C., and is deposited in crystals on the cold parts of the containing vessel.—Chem. News, 1892, lxv., 197; from Bull. Soc. Chim.

*Uric Acid—Influence of Copious Water Drinking.*—B. Schoendorff concludes from his experiments that while copious water drinking increases the excretion of total nitrogen in the urine, it has practically no influence on the elimination of uric acid.

| | Total nitrogen. | Uric acid. |
|---|---|---|
| Ordinary diet | 18.5 gm. | 1.18 gm. |
| " " and 2000 c.c. of water | 20.4 gm. | 0.93 gm. |
| " " and 4000 c.c. of water | 20.6 gm. | 1.01 gm. |
| " " and 10000 c.c. of water | 23.1 gm. | 1.14 gm. |

—Yearbook Pharm., 1891, 115; from Pflueger's Archiv, xlvi., 529–551.

*Uric Acid—Estimation.*—Bayrac estimates uric acid by the volume of nitrogen it produces when decomposed with an alkaline hypobromite; but it will be necessary to isolate it from both urea and creatinine. Evaporate 50 c.c. of the urine on a water-bath, strongly acidulate the residue so that the uric acid may be precipitated, and then wash the precipitate with alcohol, which will remove urea and creatinine. Dissolve the uric acid remaining in a strong, hot (90°–100° C.) solution of soda, and add this, best in a nitrometer, to 15 c.c. of hypobromite solution; measure the evolved nitrogen. This method is stated to be equal in accuracy to determining it by precipitation with hydrochloric acid, or as acid ammonium urate.—Am. Drug., 1892, 133, from Comptes rendus.

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# APPENDIX.

## CORRECTION IN LIST OF LIFE MEMBERS.

In the list of Life Members published on page 387, the following names reported on page 28 were inadvertently omitted:

ALBERT R. GRIFFITH, MITCHELL G. ROSENGARTEN,
HENRY W. FULLER, deceased since becoming life member (see page 18).

## CORRECTIONS IN LIST OF PAYMENTS.

Page 389. Baylis, Lewis F., for 1892 (not 1891), $5.00.
" 391. Gilpin, Henry B., for 1892 (not 1891), $5.00.
" 394. Simpson, William, for 1891 (not 1892), $5.00.

## PROGRAM FOR THE NEXT ANNUAL MEETING AT CHICAGO.

APPROVED BY THE COUNCIL.

| | |
|---|---|
| Monday, August 14, 10 a. m. | Council meeting. |
| 3 p. m. | First general session. |
| 8:30 p. m. | Reception. |
| Tuesday, August 15, 9 a. m. | Second general session. |
| 3 p. m. | Section on Commercial Interests. |
| " " | Section on Scientific Papers. |
| 8 p. m. | Section on Commercial Interests. |
| " " | Section on Scientific Papers. |
| Wednesday, August 16. | Visit to the World's Columbian Exposition. |
| Thursday, August 17, 9 a. m. | Section on Scientific Papers. |
| 3 p. m. | Section on Education and Legislation. |
| 8 p. m. | Section on Education and Legislation. |
| Friday, August 18. | Visit to the Exposition. |
| Saturday, August 19, 9 a. m. | Final session of the Association. |
| 3 p. m. | Boat ride on Lake Michigan. |

In the week following, the INTERNATIONAL PHARMACEUTICAL CONGRESS will hold its sessions.

In order satisfactorily to accomplish the business of the Association, and to provide also for visits to the Exposition, it was deemed necessary that two Sections hold sessions simultaneously, and that the Sections on Commercial Interests and on Scientific Papers be paired on Tuesday, as the members of the former Section are not so greatly interested in the work of the latter as they are in the labors of some other Sections, and vice versa.

# LIST OF COLLEGES AND ASSOCIATIONS

HAVING ACCREDITED DELEGATES TO THE FORTIETH ANNUAL MEETING, WITH THE ADDRESSES OF THEIR PRESIDENTS AND SECRETARIES.

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## COLLEGES OF PHARMACY.

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| Louisville | Edward C. Pfingst | Fred. C. Miller. |
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| Massachusetts (Boston) | S. A. D. Sheppard | C. C. Williams. |
| National (Washington, D. C.) | Joseph R. Walton | H. E. Kalusowski. |
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| Delaware | N. B. Danforth, Wilmington | John M. Harvey, Wilmington. |
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| Georgia | E. M. Wheat, Columbus | H. H. Arrington, Summerville |
| Illinois | H. Lee Hatch, Jacksonville | Frank Fleury, Springfield. |
| Indiana | Frank H. Carter, Indianapolis | F. W. Meissner, La Porte. |
| Iowa | T. W. Ruete, Dubuque | Rosa Upson, Marshalltown. |
| Kansas | M. Noll, Atchison | Mary O. Miner, Hiawatha. |
| Kentucky | O. W. Grier, Carrollton | J. W. Gayle, Frankfort. |
| Louisiana | L. F. Chalin, New Orleans | Mrs. E. Rudolf, New Orleans. |
| Maine | Asa Warren, Bangor | H. E. Bowditch, Augusta. |
| Massachusetts | Henry E. Whitney, Lawrence | Miner L. H. Leavitt, Boston. |
| Michigan | H. G. Colman, Kalamazoo | Chas. W. Parsons, Detroit. |
| Missouri | G. H. Chas. Klie, St. Louis | H. M. Whelpley, St. Louis. |
| New Hampshire | Edward H. Currier, Manchester | F. L. Way, Manchester. |
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| | | |
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| North Dakota | J. J. Wamberg, Hope | L. Christianson, Fargo. |
| Ohio | C. N. Nye, Canton | Lewis C. Hopp, Cleveland. |
| Oregon. | | |
| Pennsylvania | Wm. H. McGarrah, Scranton | J. A. Miller, Harrisburg. |
| Rhode Island | Henry M. Dudley, Woonsocket | Wm. E. Cates, Providence. |
| South Carolina | A. W. Eckel | Philip Wineman. |
| South Dakota | Z. A. Crain, Doland | I. A. Keith, Lake Preston. |
| Tennessee | J. O. Burge, Nashville | W. Vickers, Murfreesboro. |
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| Washington | A. B. Stewart, Seattle | W. B. Shaw, Seattle. |
| Wisconsin | C. Widule, Milwaukee | E. B. Heimstreet, Janesville. |
| Nova Scotia | A. F. Buckley, Halifax. | |
| Quebec (Can.) | Henry R. Gray, Montreal | E. Muir, Montreal. |

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| New York | Alfred Stover | Herman Grasser. |
| Philadelphia | C. Carroll Meyer | Wm. E. Krewson. |
| St. Louis | G. H. J. Andreas | J. C. Falk. |

## NATIONAL WHOLESALE DRUGGISTS' ASSOCIATION.

Wm. A. Robinson (*President.*) A. B. Merriam, Minneapolis (*Secretvry*).

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Names of delegates indicated by *; delegates not members, *†.

* Alexander, M. W., St. Louis, Mo.
* Alfreds, H. J., Providence, R. I.
* Alpers, Wm. C., Bayonne, N. J.
Amend, Bernard G., New York, N. Y.
Avary, Moody B., Atlanta, Ga.
* Averill, W. H., Frankfort, Ky.
* Bartlet, W. W., Boston, Mass.
Bassett, Arthur, Detroit, Mich.
Bayley, A. R., Cambridgeport, Mass.
* Bedford, P. W., New York, N. Y.
* Behrens, P. J. H., Chicago, Ill.
* Bell, S. Howard, Derry Depot, N. H.
* Belt, Z. James, Wilmington, Del.
Bernhard, C. H., Madison, Wis.
Berryhill, H. P., Connellsville, Pa.
Bingham, C. C., St. Johnsbury, Vt.
* Bodemann, W., Chicago, Ill.
Borell, H. A., Philadelphia, Pa.
Burg, John D., Philadelphia, Pa.
* Burge, J. O., Nashville, Tenn.
* Burgheim, J., Houston, Tex.
* Butler, F. H., Lowell, Mass.
Canning, Henry, Boston, Mass.
* Carver, F. H., Plymouth, Mass.
* Caspari, Chas., Jr., Baltimore, Md.
Casper, T. J., Springfield, O.
* Cates, W. E., Providence, R. I.
Chalin, L. F., New Orleans, La.
Chapman, Isaac C., Newburgh, N. Y.
Chase, W. H., Buffalo, N. Y.
Cheatham, T. A., Macon, Ga.
* Church, M. E., Falls Church, Va.
Cobb, George W., Newton Centre, Mass,
Coblentz, Virgil, New York City.
* Conrath, Adam, Milwaukee, Wis.
Cornell, E. A., Williamsport, Pa.
* Cramer, M., Boston, Mass.
* Culbreth, D. M. R., Baltimore, Md.
* Currier, Edward H., Manchester, N. H.
* Curtman, Chas. O., St. Louis, Mo.
Dadd, John A., Milwaukee, Wis.
Davis, Wm. M., Brooklyn, N. Y.
Demond, Otto J., St. Joseph, Mo.
* Diehl, C. Lewis, Louisville, Ky.
Dill, J. B., Indianapolis, Ind.
* Dohme, Chas. E., Baltimore, Md.
Downing, L. B. Hanover, N. H.
Drury, Linus D., Boston, Mass.
* Du Bois, Wm. L., Catskill, N. Y.
* Dyche, D. R., Chicago, Ill.
* Ebert, Albert E., Chicago, Ill.
* Eccles, R. G., Brooklyn, N. Y.
Eichrodt, Chas. W., Indianapolis, Ind.
* Eliel, Leo, South Bend, Ind.
Elliott, A. H., New York, N. Y.
* Emerson, H. L., Weymouth, Mass.
Estes, J. J., Rockland, Mass.
* Fennel, C. T. P., Cincinnati, O.
* Fenner, A. W., Jr., Providence, R. I.
Fink, F. W., New York, N. Y.
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Ford, H. L., New York, N. Y.
* Gayle, J. W., Frankfort, Ky.
Godbold, F. C., New Orleans, La.
* Good, J. M., St. Louis, Mo.
Gordon, W. J. M., Cincinnati, O.
* Hallberg, C. S. N., Chicago, Ill.
* Haussamen, H. L., Costa Rica.
* Hechler, G. L., Cleveland, O.
Hitchcock, J. E., Plattsburgh, N. Y.
Hodges, J. Walter, Washington, D. C.
Hodgkins, B. W., Keene, N. H.
Hoffmann, Fred., New York, N. Y.
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Hoskinson, J. T., Jr., Philadelphia, Pa.
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Ingalls, John, Macon, Ga.
Jesson, Jacob, Muskegon, Mich.
* Johnson, C. B., Middletown, O.
Jones, James H., New York, N. Y.
* Kennedy, Geo. W., Pottsville, Pa.

Keppler, Chas. L., New Orleans, La.
* Kline, M. N., Philadelphia, Pa.
Kremers, Edward, Madison, Wis.
* La Pierre, Elie H., Cambridge, Mass.
Lampa, Robert R., New York, N. Y.
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Major, A., New York, N. Y.
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Merrell, Charles, Cincinnati, O.
*†Muir, E., Montreal, Can.
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Parisen, George W., Perth Amboy, N. J.
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Richardson, H. S., Concord, Mass.
Robin, Wilbur F., Littleton, N. H.
Robinson, E. A., Lowell, Mass.
* Rogers, W. H., Middletown, N. Y.
* Ruete, T. W., Dubuque, Ia.
* Rusby, H. H., New York, N. Y.
Ryan, F. G., Philadelphia, Pa.
Sanderson, S. F., Minneapolis, Minn.
* Scherer, Andrew, Chicago, Ill.
Schueller, F. W., Columbus, O.
* Seabury, G. J., New York, N. Y.
Serodino, Herman, Cincinnati, O.
Shannon, T. R., Hartford, Conn.
Sharp, Harry, Atlanta, Ga.
Sheppard, S. A. D., Boston, Mass.
* Simon, Wm., Baltimore, Md.
Simons, A. H., Conneaut, O.
* Simson, F. C., Halifax, Nova Scotia.
* Sloan, Geo. W., Indianapolis, Ind.
* Smith, L. S., St. Augustine, Fla.
Smith, W. G., Asheville, N. C.
Snow, Chas. W., Syracuse, N. Y.
* Spofford, C. B., Claremont, N. H.
Staebler, Richard, Newark, N. J.
* Stedem, F. W. E., Philadelphia, Pa.
* Stein, J. H., Reading, Pa.
* Stevens, A. B., Ann Arbor, Mich.
* Stevens, L. F., Brooklyn, N. Y.
Stoff, Louis, New York, N, Y.
*† Sultan, Fred. W., St. Louis, Mo.
Tailby, J. Allen, Wellesley, Mass.
*† Taylor, E. P., Denver, Col.
Thompson, F. A., Detroit, Mich.
* Thompson, Wm. S., Washington, D. C.
* Torbert, W. H., Dubuque, Ia.
* Tscheppe, Adolph, New York, N. Y.
* Tufts, Chas. A., Dover, N. H.
*† Underhill, G. F., Concord, N. H.
Van Patten, W. J., Burlington, Vt.
Vernor, James, Detroit, Mich.
* Vogt, D., Charleston, S. C.
* Voss, Geo. W., Cleveland, O.
* Watson, S. P., Jacksonville, Fla.
* Wendel, H. Edward, Philadelphia, Pa.
Wetherell, Albert S., Exeter, N. H.
Wheeler, C. Gilbert, Chicago, Ill.
* Whelpley, H. M., St. Louis, Mo.
Whitney, H. M., Lawrence, Mass.
Winter, Jonas, Hagerstown, Md.
* Wood, Mason B., E. Providence, R. I.

# LIST OF NEW MEMBERS.

*Delegates becoming Members:*

Amend, Bernard G., New York, N. Y.
Burgheim, Jacob, Houston, Texas.
Church, Merten E., Falls Church, Va.
Currier, Edward H., Manchester, N. H.
Dyche, David R., Chicago, Ill.
Emerson, Hermann L., Jacksonville, Fla.
La Pierre, Elie H., Cambridgeport, Mass.
Smith, Lauriston S., St. Augustine, Fla.
Stedem, Frederick W. E., Philadelphia, Pa.
Tailby, J. Allen, Wellesley, Mass.

*Members by Proposition and Election:*

Adams, John D., Provincetown, Mass.
Amend, O. P., New York, N. Y.
Anderson, Finis L., Appleton City, Mo.
Apel, P. E., Clinton, Ia.
Arrington, Homer H., Summerville, Ga.
Auf'mwasser, Hugo W., Cincinnati, O.
Avary, Moody B., Atlanta, Ga.
Baker, Frederick W. K., Boston, Mass.
Baril, Joseph B., Manchester, N. H.
Beal, James H., Scio, O.
Beardsley, J. L., Wagoner, Ind. Ter.
Becker, Charles L., Ottawa, Kan.
Belt, James F., Wilmington, Del.
Binkley, George K., Orwigsburg, Pa.
Blakely, George C., The Dalles, Ore.
Bowker, Everett F., Littleton, N. H.
Boyd, William P., Arcalo, Ill.
Brandon, Cole W., Anaconda, Mont.
Braunwarth, Alice L., Muscatine, Ia.
Bridges, Charles H., Framingham, Mass.
Brother, William, Park City, Utah.
Brundage, Albert H., Brooklyn, N. Y.
Burghardt, George H., Pittsfield, Mass.
Butler, P. H., Vernal, Utah.
Carroll, Edward, Boston, Mass.
Case, Chas. H., Jefferson, O.
Chapa, Francisco A., San Antonio, Tex.
Chapin, Henry A., Brattleboro, Vt.
Chase, Walter H., Buffalo, N. Y.
Cobb, George W., Boston, Mass.
Cohn, Richard, San Antonio, Tex.
Colen, James A., Brooklyn, N. Y.
Cone, Alfred G., Haydenville, Mass.
Cook, Frank L., Minneapolis, Minn.
Copeland, Sidney F., Boston, Mass.
Cox, John T., Indianapolis, Ind.
Crady, Edward E., Sioux City, Ia.
Criswell, Francis M., Washington, D. C.
Cronheim, S., Atlanta, Ga.
Crum, John D., Selma, Ala.
Davis, Eugene M., Dunkirk, N. Y.
Demond, Otto J., St. Joseph, Mo.
Dennin, Edwin C., Brooklyn, N. Y.
Desmond, Edward, Buffalo, Wyo.
Dixson, F. H., East Warren, Pa.
Dorner, Emil A., Chicago, Ill.
Downing, Lucien B., Hanover, N. H.
Dufault, Hilaire, Amesbury, Mass.
Dunham, Henry B., Abington, Mass.
Dutcher, Alfred L., St. Albans, Vt.
Eccles, Mary H., Brooklyn, N. Y.
Ehrlicher, Henry M., Pekin, Ill.
Eichrodt, Charles W., Indianapolis, Ind.
Elliott, Arthur H., New York, N. Y.
Enterkine, James E., Galena, Kan.
Fahey, Edward F., Pittsfield, Mass.
Farrell, Thomas H., Pittsfield, Mass.
Fechter, Arthur E., Chicago, Ill.
Fetterman, T. M., Dallas, Tex.
Finn, Thomas, Fayette, Mo.
Fischer, Oscar F., Chicago, Ill.
Fish, Frederic W., Orange, Mass.
Fisher, Elbert E., Bridgeport, Conn.
Flood, William H., Cleveland, O.
Forsyth, Wm. K., Chicago, Ill.
Fortier, Lawrence H., Holyoke, Mass.
Franken, James L., Salt Lake City, Utah.
Frost, William A., St. Paul, Minn.
Gano, William H., Philadelphia, Pa.
Gillett, John, Coopersville, Mich.

Gooding, C. J., Knoxville, Tenn.
Gorman, John T. B., Boston, Mass.
Gray, William, Chicago, Ill.
Green, Hamer H., Bloomington, Ill.
Greiner, William E., Paris, Tex.
Groetsch, George W., Passaic, N. J.
Gurney, Charles H., Atwater, O.
Hale, Chester S., Worcester, Mass.
Harding, Lawrence A., Fergus Falls, Minn.
Harris, Chester C., Tampa, Fla.
Hartwig, Otto J., Chicago, Ill.
Hayes, James H., Boston, Mass.
Hays, Joseph A., Pittsburgh, Pa,
Hervey, James, Dubuque, Ia.
Hess, Paul L., Kansas City, Mo.
Higby, William H., Streator, Ill.
Hitchcock, John E., Plattsburgh, N. Y.
Hobbs, William, Brookfield, Mass.
Howland, Edgar J., Somerville, Mass.
Hurd, John C., Great Falls, N. H.
Hydren, Carl, Pittsfield, Mass.
Hynard, Eugene R., New York, N. Y.
Johnson, Frank W., Prairie City, Ia.
Jones, James H., New York, N. Y.
Keith, Irwin A., Lake Preston, S. Dak.
Knoebel, Thomas, East St. Louis, Ill.
Knudsen, Rudolph H., Chicago, Ill.
Koch, Julius A., Pittsburgh, Pa.
Koenigstein, Daniel J., Norfolk, Neb.
Kraemer, Henry, New York, N. Y.
La Rue, William I., Athens, Tex.
Lampa, Robert R., New York, N. Y.
Layton, Thomas, St. Louis, Mo.
Lewis, Ernest G., Boston, Mass.
Long, Jon. C., Denver, Col.
Loveland, Charles H., Binghamton, N. Y.
Lovis, Henry C., New York, N. Y.
Macmillan, Andrew J., Seymour, Tex.
Maghee, Thomas G., Rawlins, Wyo.
Maine, August, Utica, N. Y.
Major, Alphonse, New York, N. Y.
Martin, Robert R., New York, N. Y.
Matkin, George G., Velasco, Tex.
Mayer, John F., Buffalo, N. Y.
McColgan, Adam T., Boston, Mass.
McComas, Percy G., Washington, D. C.
McFarland, George F., Dover, N. H.
Mehl, Henry W., Leavenworth, Kan.
Miner, Mrs. M. O., Hiawatha, Kan.
Moore, Charles G., Eufaula, Ind. Ter.
Morgan, Eugene H., Granbury, Tex.
Morland, Robert L., Montreal, Can.
Murphy, J. J., Pittsfield, Mass.
Myhre, Olaus G., Eddy, N. Mex.
Neathery, James M., Van Alstyne, Tex.
Newton, Philo W., Hartford, Conn.
Nowers, Lawrence E., Kingston, N. Mex.
Parisen, George W., Perth Amboy, N. J.
Patton, Joseph, Tipton, Ia.
Peacock, Josiah C., Philadelphia, Pa.
Percy, William G., Brainerd, Minn.
Perham, Henry A., Lexington, Mass.
Perkins, Charles W., New Britain, Conn.
Petsche, Bismarck W., Louisville, Ky.
Pfafflin, Henry A., Indianapolis, Ind.
Plummer, J. W. V. R., Key West, Fla.
Porter, Louis F., Cambridgeport, Mass.
Porter, Martin L., Danforth, Me.
Porter, Millett N., Chicago, Ill.
Rand, Daniel M., S. Windham, Me.
Ray, Peter W., Brooklyn, N. Y.
Reed, Charles C., Lincoln, Ill.
Richardson, Horatio S., Concord, Mass.
Riddell, Benjamin F., Fall River, Mass.
Riggs, W. E., Fairfield, Neb.
Robert, William H., Jr., Denison, Tex.
Roberts, William, Fort Meyer, Va.
Robino, Wilbur F., Littleton, N. H.
Robinson, William A., Auburn, Me.
Ross, S. P., Houston, Tex.
Ruenzel, Henry G., Milwaukee, Wis.
Ryan, Frank G., Philadelphia, Pa.
Ryan, Henry, Taftville, Conn.
Sargent, Jesse W., Malden, Mass.
Schieffelin, William J., New York, N. Y.
Schmitter, Jonathan, Gypsum, Kan.
Schulze, Louis, Baltimore, Md.
Schwab, Leslie W., Chicago, Ill.
Scott, James M., Chicago, Ill.
Sempill, Walter M., Chicago, Ill.
Shake, H. C., Indianapolis, Ind.
Shannon, Thomas R., Hartford, Conn.
Simons, Arthur H., Conneaut, O.
Sleuman, Charles A., Jr., Boston, Mass.
Smith, B. Frank, Chicago, Ill.
Smith, George S., Liberal, Kan.
Smith, John C., Plattsburgh, N. Y.
Smith, Linville H., Boston, Mass.
Smith, Whitefoord G., Asheville, N. C.
Staebler, Richard, Newark, N. J.
Steele, George R., Thompsonville, Conn.
Stoff, Louis, New York, N. Y.
Sumner, Alphonso, Boston, Mass.
Taylor, George A., Methuen, Mass.

Taylor, Thomas L., Custer City, S. Dak.
Thomasson, Anders, Lowell, Mass.
Tracy, David W., Hartford, Conn.
Trudel, Jacques J., Amesbury, Mass.
Tyner, Charles O., Atlanta, Ga.
Van Patten, W. J., Burlington, Vt.
Varney, Edward F., Boston, Mass.
Wagner, William I., Jackson, Ga.
Wakefield, Seth D., Lewiston, Me.
Walker, Charles W., Lawrence, Mass.
Watson, William S., Atlanta, Ga.
Weber, Eugene, Chicago, Ill.
Werner, Rudolph C., Brooklyn, N. Y.
West, Charles A., Boston, Mass.
Wetherell, Albert S., Exeter, N. H.
Wheat, E. M., Columbus, Ga.
Wheeler, C. Gilbert, Chicago, Ill.
Wheeler, William D., Boston, Mass.
Wilder, George P., Lebanon, N. H.
Willett, G. Howard, Kansas City, Mo.
Williams, E. M., Meyers, Fla.
Winnberg, John M., Jamestown, N. Y.
Wright, Albert F., West Newton, Mass.
Yocum, A. L., Chariton, Ia.
Zimmer, Harry E., Indianapolis, Ind.

# LIST OF PUBLICATIONS RECEIVED

## FOR THE AMERICAN PHARMACEUTICAL ASSOCIATION.

Societies and editors are respectfully requested to forward all publications intended for the American Pharmaceutical Association to the Permanent Secretary. European exchanges, if not sent by mail, will reach us through the Smithsonian Institution at Washington. JOHN M. MAISCH,
North Tenth, below Race Street, Philadelphia.

☞ Proceedings of State Pharmaceutical Associations, also American Pharmaceutical Journals for use of the REPORTER ON THE PROGRESS OF PHARMACY, should be sent to HENRY KRÆMER, 18 West 60th St., New York.

American Druggist, New York, 1892.
American Journal of the Medical Sciences, 1892.
American Journal of Pharmacy, 1892.
Anzeiger der K. K. Gesellschaft der Wissenschaften, Wien, 1892.
Bolletino delle Pubblicazioni Italiane ricevute per Diritto di Stampa, 1892.
Calendar of the Pharmaceutical Society of Ireland, 1892.
Deutsch-Amerikanische Apotheker-Zeitung, New York, 1892.
Nachrichten von der Königl. Gesellschaft der Wissenschaften zu Göttingen, 1891.
Pharmaceutical Journal and Transactions, London, 1892.
Pharmaceutical Record, New York, 1892.
Pharmaceutische Rundschau, New York, 1892.
Proceedings of the American Academy of Arts and Sciences, vol. xxvi., 1891.
Proceedings of the Philosophical Society of Glasgow, 1891-92, vol. xxiii.
——— Index to the same, vol. i.–xx.
Report (71st annual) of the American Mercantile Library Association, New York.
The Canadian Pharmaceutical Journal, Toronto, 1892.
The Chemist and Druggist, London, 1892.
The Druggists' Circular, New York, 1892.
The National Druggist, St. Louis, 1892.
The Western Druggist, Chicago, 1892.
Transactions of the Academy of Science of St. Louis, vol. v., Nos. 3 and 4.
University Extension Bulletin, Nos. 1-4, Albany, N. Y., 1892.
Yearbook of Pharmacy and Transactions of the British Pharmaceutical Conference, 1891, 1892.
Zeitschrift des Allgemeinen Oesterreichischen Apotheker-Vereines, Wien, 1892.

# LIST OF SOCIETIES, LIBRARIES AND JOURNALS,

TO WHOM COMPLIMENTARY COPIES OF THE PROCEEDINGS OF THIS ASSOCIATION ARE FORWARDED.

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The State Libraries of all the States of the Union except Connecticut. (At the request of the State Librarian of Connecticut, a copy of the Proceedings is sent to Trinity College, Hartford, Conn.)

*Alabama.*—State Library of Alabama, Montgomery.

*Arkansas.*—State Library of Arkansas, Little Rock.

*California.*—California College of Pharmacy, 113 Fulton Street, San Francisco.
" State Library of California, Sacramento.

*Colorado.*—State Library of Colorado, Denver.

*Connecticut.*—Medical Journal and Library Association, Hartford.
" Trinity College, Hartford.
" Silas Bronson Library, Waterbury.
" Yale College, New Haven.

*Delaware.*—State Library of Delaware, Dover.

*District of Columbia.*—National College of Pharmacy, Washington, 820 I Street, N. W.
" Bureau of Education, Washington.
" Congressional Library, Washington.
" Department of Agriculture, Washington.
" Library of the American Medical Association, Washington.
" Smithsonian Institution, Washington.
" Surgeon-General United States Army, Washington.
" Surgeon-General United States Marine Hospital Service, Washington.
" Surgeon-General United States Navy, Washington.
" United States Patent Office, Washington.

*Florida.*—State Library of Florida, Tallahassee.

*Georgia.*—State Library of Georgia, Atlanta.

*Illinois.*—Chicago College of Pharmacy, 465 State Street, Chicago.
" Illinois College of Pharmacy, 40 Dearborn Street, Chicago.
" The Western Druggist, 358 Dearborn Street, Chicago.
" State Library of Illinois, Springfield.

*Indiana.*—Department of Pharmacy, Purdue University, Lafayette.
" State Library of Indiana, Indianapolis.

*Iowa.*—State Library of Iowa, Des Moines.

*Kansas.*—Department of Pharmacy, Kansas State University, Lawrence.
" State Library of Kansas, Topeka.

*Kentucky.*—Louisville College of Pharmacy, First and Chestnut Streets, Louisville.
" State Library of Kentucky, Frankfort.

*Louisiana.*—State Library of Louisiana, Baton Rouge.

*Maine.*—Bowdoin College, Brunswick.
" Maine Insane Asylum, Augusta.
" State Library of Maine, Augusta.

*Maryland.*—Maryland College of Pharmacy, Aisquith Street, Baltimore.
" Maryland Academy of Sciences, Baltimore.
" Medical and Chirurgical Faculty of Maryland, Dr. G. L. Taneyhill, Secretary, Baltimore.
" University of Maryland, Baltimore.
" State Library of Maryland, Annapolis.
*Massachusetts.*—Amherst College, Amherst.
" American Academy of Arts and Sciences, Boston.
" Boston Athenæum, Boston.
" City Library, Boston.
" City Hospital, Boston.
" Harvard University, Cambridge.
" Massachusetts College of Pharmacy, Botolph and Garrison Streets, Boston.
" Massachusetts General Hospital, Boston.
" Medical Library Association, Boston.
" State Library of Massachusetts, Boston.
*Michigan.*—Michigan State Medical Society, Dr. C. W. Hitchcock, Secretary, Detroit.
" The Pharmaceutical Era, 99 Woodward Avenue, Detroit.
" University of Michigan, Ann Arbor.
" State Library of Michigan, Lansing.
*Minnesota.*—National Wholesale Druggists' Association, A. B. Merriam, Secretary, St. Paul.
" State Library of Minnesota, St. Paul.
*Mississippi.*—State Library of Mississippi, Jackson.
*Missouri.*—Academy of Science of St. Louis, St. Louis.
" National Druggist, 8th and Spruce Streets, St. Louis.
" The Druggist, 215 South 4th Street, St. Louis.
" St. Louis College of Pharmacy, 412 South 6th Street, St. Louis.
" St. Louis Mercantile Library, St. Louis.
" St. Louis Public School Library, St. Louis.
" State Library of Missouri, Jefferson City.
*Montana.*—State Library of Montana, Helena.
*Nebraska.*—State Library of Nebraska, Lincoln.
*Nevada.*—State Library of Nevada, Carson City.
*New Hampshire.*—Dartmouth College, Hanover.
" State Library of New Hampshire, Concord.
*New Jersey.*—New Jersey State Lunatic Asylum, Trenton.
" State Library of New Jersey, Trenton.
*New York.*—Albany College of Pharmacy, Eagle Street, Albany.
" American Druggist, 37 College Place, New York.
" Astor Library, New York.
" College of Pharmacy of the City of New York, 211 E. 23d Str., New York.
" Deutsch-Amerikanische Apotheker Zeitung, 104 John Street, New York.
" Druggists' Circular, 72 William Street, New York.
" Literary and Scientific Society of German Apothecaries, 211 East 23d Street, New York.
" Mercantile Library, New York.
" New York Academy of Medicine, 12 West 31st Street, New York.
" Pharmaceutical Record, 96 Reade Street, New York.
" Pharmaceutische Rundschau, 183 Broadway, New York.
" Long Island Historical Society, Brooklyn.
" State Library of New York, Albany.

*New York.*—W. E. Carson, stenographer, 2 Tribune Building, New York.
*North Carolina.*—State Library of North Carolina, Raleigh.
*North Dakota.*—State Library of North Dakota, Bismarck.
*Ohio.*—Cincinnati Academy of Medicine, Cincinnati.
" Cincinnati College of Pharmacy, Cincinnati.
" Mussey Medical Library, Cincinnati.
" Cincinnati Hospital Library, Cincinnati.
" Longview Asylum, Carthage, Hamilton county.
" State Library of Ohio, Columbus.
*Oregon.*—State Library of Oregon, Salem.
*Pennsylvania.*—Academy of Natural Sciences, 19th and Race Streets, Philadelphia.
" American Journal of Medical Sciences, 706 Sansom Street, Philadelphia,
" American Journal of Pharmacy, 145 North 10th Street, Philadelphia.
" American Philosophical Society, 5th and Chestnut Sts., Philadelphia.
" College of Physicians, 13th and Sansom Streets, Philadelphia.
" Franklin Institute, South 7th Street, Philadelphia.
" Mercantile Library, South 10th Street, Philadelphia.
" Pennsylvania Hospital, 8th and Pine Streets, Philadelphia.
" Philadelphia College of Pharmacy, 145 North 10th Street, Philadelphia.
" Philadelphia Library, Locust and Juniper Streets, Philadelphia.
" Pittsburgh College of Pharmacy, Pittsburgh.
" State Library of Pennsylvania, Harrisburg.
*Rhode Island.*—State Library of Rhode Island, Providence.
*South Carolina.*—South Carolina Medical Association, Dr. M. P. Ravenel, Secretary, Charleston.
" State Library of South Carolina, Columbia.
*South Dakota.*—State Library of South Dakota, Pierre.
*Tennessee.*—State Library of Tennessee, Nashville.
*Texas.*—State Library of Texas, Austin.
*Vermont.*—University of Vermont, Burlington.
" State Library of Vermont, Montpelier.
*Virginia.*—State Library of Virginia, Richmond.
*Washington.*—State Library of Washington, Olympia.
*West Virginia.*—State Library of West Virginia, Charleston.
*Wisconsin.*—Department of Pharmacy, University of Wisconsin, Madison.
" State Library of Wisconsin, Madison.
*Canada.*—Halifax Pharmaceutical Society, Halifax, Nova Scotia.
" Ontario College of Pharmacy, Toronto.
" Pharmaceutical Association of the Province of Quebec, E. Muir, Secretary, 595 Lagauchetiere Street, Montreal.
" University of Toronto, Toronto.
*Mexico.*—Sociedad Mexicana Historia Natural, Mexico.
*Argentine Republic.*—Sociedad de Farmacia Argentina, Buenos Ayres.
*Austria.*—Zeitschrift d. Allg. Oesterreichischen Apotheker-Vereines, Wien.
" K. K. Gesellschaft der Aertze, Wien.
" K. K. Akademie der Wissenschaften, Wien.
*Belgium.*—Académie Royale de Médecine de Belgique, Bruxelles.
" Société Royale de Pharmacie de Bruxelles.
" Société Royale des Sciences Médicales et Naturelles, Bruxelles.
" Société de Pharmacie d'Anvers.
*Denmark.*—Archiv for Pharmacie, S. M. Trier, Kjobenhavn.
" Danmark's Apotheker Forening, Gust. Lotze, President, Odense.

*France.*—Bibliothèque de l'École supérieure de Pharmacie, Paris.
*Germany.*—Archiv der Pharmacie, Zimmerstrasse No. 3/4, Berlin, S. W., 12.
" K. Akademie der Wissenschaften, Göttingen.
" K. Bayer. Akademie der Wissenschaften, München.
" K. Bibliothek der Universität Strassburg.
" Pharmaceutisches Institut, Universität Erlangen.
*Great Britain.*—British Pharmaceutical Conference, 17 Bloomsbury Square, London.
" Pharmaceutical Society of Great Britain, 17 Bloomsbury Square, London.
" Pharmaceutical Journal and Transactions, 17 Bloomsbury Square, London.
" Chemical News, Boy Court, Ludgate Hill, London, E. C.
" Chemist and Druggist, 44 Cannon Street, London.
" British Museum, London.
" Association of Chemists and Druggists, Wolverhampton.
" Coventry and Warwickshire Pharmaceutical Association, Coventry.
" Liverpool Chemists' Association, Liverpool.
" Pharmaceutical Society, 36 York Place, Edinburgh.
" Pharmaceutical Society of Ireland, Dublin.
" Philosophical Society, Glasgow.
*Italy.*—R. Biblioteca Nazionale Centrale, Firenze.
" Bollettino Chimico Farmaceutico, Via Fiori Oscuri, 11, Milano.
*Netherlands.*—Nederlandsche Maatschappij ter bevordering der Pharmacie, M. L. Q. van Leddon Hulsebosch, Secretary, Amsterdam.
*Norway.*—Kongelige Norske Universitet i Christiani.
*Portugal.*—Centro Pharmaceutico Portuguez, Rua do Rosario, 21, Porto.
*Russia.*—Pharmaceutische Gesellschaft in St. Petersburg, St. Petersburg.
" Pharmaceutisches Institut, Dorpat, Russia.
*Sweden.*—Pharmaceutical Institution, Stockholm, Sweden.
*Switzerland.*—Schweizerische Wochenschrift für Pharmacie, F. Seiler, Lausanne.
*Australia.*—Pharmaceutical Society of Victoria, Melbourne.
" Australasian Journal of Pharmacy, Melbourne.
" Pharmaceutical Society of New South Wales, Sydney.
" Pharmaceutical Society of New Zealand, Auckland.

# GENERAL INCORPORATION LAW FOR THE DISTRICT OF COLUMBIA.

## SECTIONS APPLICABLE TO THE AMERICAN PHARMACEUTICAL ASSOCIATION.

### CLASS 3, SOCIETIES, BENEVOLENT, EDUCATIONAL, ETC.

SEC. 545. Any three or more persons of full age, citizens of the United States, a majority of whom shall be citizens of the District, who desire to associate themselves for benevolent, charitable, educational, literary, musical, scientific, religious, or missionary purposes, including societies formed for mutual improvement, or for the promotion of the arts, may make, sign, and acknowledge before any officer authorized to take acknowledgement of deeds in the District, and file in the office of the Recorder of Deeds, to be recorded by him, a certificate in writing, in which shall be stated:

First. The name or title by which such society shall be known in law.

Second. The term for which it is organized, not exceeding twenty years.

Third. The particular business and objects of the society.

Fourth. The number of its trustees, directors, or managers for the first year of its existence.

SEC. 546. Upon filing their certificate, the persons who shall have signed and acknowledged the same, and their associates and successors, shall be a body politic and corporate, by the name stated in such certificate; and by that name they and their successors may have and use a common seal, and may alter and change the same at pleasure, and may make by-laws and elect officers and agents; and may take, receive, hold and convey real and personal estate necessary for the purposes of the society as stated in their certificate.

SEC. 547. Such incorporated society may annually, or oftener, elect from its members its trustees, directors, or managers, at such time and place, and in such manner as may be specified in its by-laws, who shall have the control and management of the affairs and funds of the society, and a majority of whom shall be a quorum for the transaction of business; and whenever any vacancy shall happen among such trustees, directors, or managers, the vacancy shall be filled in such manner as shall be provided by the by-laws of the society.

SEC. 548. The trustees, directors, or stockholders of any existing benevolent, charitable, educational, musical, literary, scientific, religious, or missionary corporation, including societies formed for mutual improvement, may, by conforming to the requirements herein, re-incorporate themselves, or continue their existing corporate powers under this chapter, or may change their name, stating in their certificate the original name of such corporation as well as their new name assumed; and all the property and effects of such existing corporation shall vest in and belong to the corporation so re-incorporated or continued.

SEC. 549. Such corporations may sell and dispose of any real estate they may acquire by purchase, gift, or devise, as follows: whenever any lot purchased for the use of the corporation, or any building erected thereon, shall become ineligible for the uses for which the lot was purchased or the building erected, to be determined by a vote of two-thirds of the shares of the stock of the corporation or the members of the corporation, at a meeting of the stockholders, or corporators, or members specially called for that purpose, the proceedings of which meeting shall be duly entered in the records of the

corporation; said lot or building may be sold, and the proceeds thereof may be vested in another lot, or in the erection of another building, or both.

SEC. 550. When any real estate shall have been devised or given to any such corporation for any specified benevolent purpose, and where, by a vote of three-fourths of the stock held by the stockholders, or three-fourths of the corporators, if no shares of stock have been created, at a meeting called for the purpose, of which such stockholders or corporators or members shall have at least ten days' notice, the corporation shall determine to surrender their corporate powers and cease to act under the same, said real and personal estate so acquired shall be sold at public auction, proper notice of the time and place of sale having been given, and the proceeds of the sale equitably distributed among the stockholders or corporators, or disposed of for the promotion and advancement of the objects for which such corporation was originally organized.

SEC. 551. No corporation acting under the six preceding sections shall hold real estate more than five years, except so much as shall be necessary for the purposes named in its certificate.

SEC. 552. The provisions of this chapter shall not extend or apply to any association or individual who shall, in the certificate filed with the Recorder of Deeds, use or specify a name or style the same as that of any previously existing incorporated body in the District.

*Approved 5 May, 1870, c. 80, v. 16, pp. 98–116—Revised Statutes of the United States, relating to the District of Columbia.*

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# CERTIFICATE OF INCORPORATION OF THE AMERICAN PHARMACEUTICAL ASSOCIATION.

Whereas, we, the undersigned, desire to form an association having for its object to unite the educated and reputable Pharmacists and Druggists of America, as will more fully hereinafter appear;

Now, therefore, we do hereby certify as follows:

*First*, The corporate name of the association is the American Pharmaceutical Association.

*Second*, This association shall continue until dissolved by the action of its members, or by the operation of law.

*Third*, The objects and business of said association are as follows:

*a*. To improve and regulate the drug market, by preventing the importation of inferior, adulterated or deteriorated drugs, and by detecting and exposing home adulterations.

*b*. To encourage proper relations between Druggists, Pharmacists, Physicians, and the people at large, which shall promote the public welfare, and tend to mutual strength and advantage.

*c*. To improve the science and art of Pharmacy by diffusing scientific knowledge among Apothecaries and Druggists, fostering pharmaceutical literature, developing talent, stimulating discovery and invention, and in encouraging home production and manufacture in the several departments of the drug business.

*d*. To regulate the system of apprenticeship and employment, so as to prevent, so far as possible, the evils flowing from deficient training in the responsible duties of preparing, dispensing and selling medicines.

*e*. To suppress empiricism, and to restrict the dispensing and sale of medicines to regularly educated Druggists and Apothecaries.

*f.* To uphold standards of authority in the education, theory and practice of Pharmacy.

*g.* To create and maintain a standard of professional honesty equal to the amount of our professional knowledge, with a view to the highest good and the greatest protection to the public.

*Fourth,* The concerns and affairs of the Association shall be managed by a Council, which shall consist for the first year of John U. Lloyd, Maurice W. Alexander, Alexander K. Finlay, Karl Simmon, Samuel A. D. Sheppard, John M. Maisch, James Vernor, C. Lewis Diehl, William H. Rogers, William Saunders, Albert E. Ebert, Philip C. Candidus, George W. Kennedy, Albert H. Hollister, James M. Good, Lewis C. Hopp and William Dupont.

Given under our respective hands and seals this 12th day of December, A. D. 1887.

| | | |
|---|---|---|
| Signed: | JOHN U. LLOYD, | MAURICE W. ALEXANDER, |
| | ALEX. K. FINLAY, | KARL SIMMON, |
| | SAMUEL A. D. SHEPPARD, | JOHN M. MAISCH, |
| | JAMES VERNOR, | C. LEWIS DIEHL, |
| | WILLIAM H. ROGERS, | WM. SAUNDERS, |
| | ALBERT E. EBERT, | PHILIP C. CANDIDUS, |
| | GEORGE W. KENNEDY, | ALBERT H. HOLLISTER, |
| | JAMES M. GOOD, | LEWIS C. HOPP, |
| | | WILLIAM DUPONT, |
| Members of the Council, | | |
| And | JOHN A. MILBURN, | G. G. C. SIMMS, |
| | E. B. BURY, | Z. W. CROMWELL, |
| | W. S. THOMPSON, | JOHN R. MAJOR, |
| | CHARLES CHRISTIANI, | W. G. DUCKETT, |
| | A. J. SCHAFHIRT, | GEO. W. BOYD, |
| | O. H. COUMBE, | HENRY A. JOHNSTON, |
| | GEO. B. LOCKHART, | W. C. MILBURN, |
| | T. C. MURRAY, | ARTHUR NATTANS, |
| | JOSEPH R. WALTON, | THOMAS M. WEHRLY, |

of the District of Columbia.

(Notaries' certificates attached to the original document attest the genuineness of each and every signature.)

Received for Record February 21st, 1888, at 1 : 05 P. M., and recorded in Liber No. 4, fol. 302, Acts of Incorporation, District of Columbia, and examined.

Signed: JAMES M. TROTTER, *Recorder.*

SEAL:
Office of Recorder of Deeds,
District of Columbia,
Washington, D. C.

# CONSTITUTION AND BY-LAWS

OF THE

# AMERICAN PHARMACEUTICAL ASSOCIATION.

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## CONSTITUTION.

ARTICLE I. This Association shall be called the "American Pharmaceutical Association." Its aim shall be to unite the educated and reputable Pharmacists and Druggists of America in the following objects:

1. To improve and regulate the drug market, by preventing the importation of inferior, adulterated, or deteriorated drugs, and by detecting and exposing home adulterations.

2. To encourage proper relations between Druggists, Pharmacists, Physicians, and the people at large, which shall promote the public welfare, and tend to mutual strength and advantage.

3. To improve the science and art of Pharmacy by diffusing scientific knowledge among Apothecaries and Druggists, fostering pharmaceutical literature, developing talent, stimulating discovery and invention, and encouraging home production and manufacture in the several departments of the drug business.

4. To regulate the system of apprenticeship and employment, so as to prevent, as far as practicable, the evils flowing from deficient training in the responsible duties of preparing, dispensing and selling medicines.

5. To suppress empiricism, and to restrict the dispensing and sale of medicines to regularly educated Druggists and Apothecaries.

6. To uphold standards of authority in the Education, Theory and Practice of Pharmacy.

7. To create and maintain a standard of professional honesty equal to the amount of our professional knowledge, with a view to the highest good and greatest protection to the public.

ARTICLE II. This Association shall consist of active, life, and honorary members, and shall hold its meetings annually.

ARTICLE III. The officers of the Association shall be a President, three Vice-Presidents, a Permanent Secretary, a Local Secretary, a Treasurer, and a Reporter on the Progress of Pharmacy, all of whom, with the exception of the Permanent Secretary, shall be elected annually, and shall hold office until an election of successors.

ARTICLE IV. All moneys received from life membership, together with such funds as may be bequeathed, or otherwise donated to the Association, shall be invested by the Treasurer in United States Government or State securities, the annual interest of which only shall be used by the Association for its current expenses.

ARTICLE V. Every proposition to alter or amend this Constitution shall be submitted in writing, and may be balloted for at the next Annual Meeting, when, upon receiving the votes of three-fourths of the members present, it shall become a part of this Constitution.

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# BY-LAWS.

## CHAPTER I.

### *Of the President and Vice-Presidents.*

ARTICLE I. The President shall preside at all meetings of the Association, except those of the special Sections, as hereinafter provided. In his absence or inability, one of the Vice-Presidents, or in the absence of all, a President *pro tempore*, shall perform the duties of President.

ARTICLE II. In the absence of the Permanent Secretary, the President shall appoint a Recording Secretary *pro tempore*.

ARTICLE III. In meetings, the President shall take the chair at the proper time; announce all business; receive all proper motions, resolutions, reports and communications, and order the vote upon all proper questions at the proper time.

ARTICLE IV. In all ballotings, and on questions upon which the ayes and nays are taken, the President is required to vote, but his name shall be called last; in other cases he shall not vote, unless the members be equally divided, or unless his vote, if given to the minority, will make the decision equal; and in case of such equal division, the motion is lost.

ARTICLE V. He shall enforce order and decorum; it is his duty to hear all that is spoken in debate, and in cases of personality and impropriety he shall promptly call the speaker to order. He shall decide all questions of order, subject to the right of appeal, unless in cases where he prefers to submit the matter to the meeting; decide promptly who is to speak when two or more members rise at the same moment, and be careful to see that business is brought forward in proper order.

ARTICLE VI. He shall have the right to call a member to the chair, in order that he may take the floor in debate. He shall see that the Constitution and By-Laws are properly enforced.

ARTICLE VII. He shall appoint all committees, unless provided for in the By-Laws, or otherwise directed by the Association.

ARTICLE VIII. He shall sign the certificates of membership, and countersign all orders on the Treasury. He shall obey the instructions of the Association, and authenticate by his signature, when necessary, its proceedings.

ARTICLE IX. He shall present at each annual meeting an address, embodying general scientific facts and events of the year, or discuss such scientific questions as may to him seem suitable to the occasion.

## CHAPTER II.

### *Of the Permanent Secretary.*

Article I. The Permanent Secretary shall be elected to hold office permanently during the pleasure of the Association. He shall receive from the Treasurer an annual salary of $750, and the amount of his expenses incident to the meeting, in addition to his salary.

Article II. He shall keep fair and correct minutes of the proceedings of the meetings, and carefully preserve, on file, all reports, essays, and papers of every description received by the Association, and shall be charged with the necessary foreign and scientific correspondence, and with editing, publishing, and distributing the Proceedings of the Association, under the direction of the Council.

Article III. He shall read all papers handed him by the President for that purpose; shall call and record the ayes and nays, whenever they are required to be called; shall notify the chairman of every special committee of his appointment, giving him a list of his colleagues, and stating the business upon which the committee is to act: and shall notify every member of the time and place of each annual meeting.

## CHAPTER III.

### *Of the Local Secretary.*

Article I. The Local Secretary shall be elected annually, near the close of the annual meeting, and shall reside at or near the place where the next annual meeting of the Association is to be held.

Article II. He shall assist the Permanent Secretary in his duties: shall co-operate with the Council and any Local Committee in making arrangements for the annual meeting; shall correspond with the chairmen of the several committees, and with other members, in advance of the meeting, for the promotion of its objects, and shall have the custody of specimens, papers, and apparatus destined for use or exhibition at the meetings.

Article III. An exhibition of objects interesting to pharmacists shall be held each year, under the direction of the Local Secretary and the Committee on Commercial Interests.

## CHAPTER IV.

### *Of the Treasurer.*

Article I. The Treasurer shall collect and take charge of the funds of the Association, and shall hold, sign, and issue the certificates of membership.

Article II. He shall pay no money except on the order of the Secretary, countersigned by the President, and accompanied by the proper vouchers.

Article III. He shall report to the Council, previous to each annual meeting, the names of such members as have failed to pay their annual contributions for three years.

Article IV. He shall present a statement of his accounts at each annual meeting of

the Council, that they may be audited; he shall receive an annual salary of $750, and the amount of his expenses incident to the meeting, in addition to his salary.

ARTICLE V. The Treasurer, in order that he may qualify for the office to which he has been elected, shall file a good and sufficient bond or bonds to the amount of $5,000 with the Chairman of the Council for the faithful performance of his duties as Treasurer, this bond or bonds to be signed and executed by two sureties or Trust Company acceptable to the Council.

## CHAPTER V.

### *Of the Reporter on the Progress of Pharmacy.*

ARTICLE I. The Reporter on the Progress of Pharmacy shall be elected annually, and shall receive from the Treasurer for his services an annual sum of $750.

ARTICLE II. All journals and volumes received in exchange for the Proceedings by the Permanent Secretary, and such other journals as shall be deemed necessary, shall be sent to him by that officer for use in the compilation of his report; for all of which he shall be held responsible until returned to the Permanent Secretary for preservation.

ARTICLE III. From these and other available sources, he shall prepare a comprehensive report on the improvements and discoveries in Pharmacy, Chemistry and Materia Medica, and the collateral branches of knowledge; on the changes in conditions of Pharmaceutical Institutions; together with such statistical, biographical and obituary notices as will furnish an epitome of the progress and changes in the science and practice of Pharmacy, and of its votaries, at home and abroad.

ARTICLE IV. The Report on the Progress of Pharmacy shall commence with July 1st of the preceding year, and end with June 30th of the year in which it is submitted, shall be written in a form fitted for the printer, and shall be presented completed at the annual meeting.

ARTICLE V. In case of the illness or other inability of the Reporter to carry on the work of the report, the Permanent Secretary and the Chairman of the Council shall be required to make the best arrangements they can command to continue the work to its completion.

## CHAPTER VI.

### *Of the Council.*

ARTICLE I. The business of the Association which is not of a scientific character shall be in charge of a Council, which shall be empowered to transact business for the Association between the times of meeting, and to perform such duties as may from time to time be committed to them by the Association; their acts, however, being subject to revision by the Association. Any member of the Association may attend the meetings of the Council, and may, by a special vote of the Council, be invited to speak on any subject under discussion.

ARTICLE II. The Council shall consist of seventeen members, nine of whom shall be elected by ballot by the Association in the following manner: Three of them to serve for one year, three for two years, three for three years. At each subsequent annual meeting, three members shall be elected to take the places of those whose terms will

then expire, to serve for the term of three years. No elected member of the Council, after having served one term, shall be eligible for re-election to the Council to serve the next succeeding term.

ARTICLE III. The President, Vice-President, Secretary, Local Secretary, Treasurer, and Reporter on the Progress of Pharmacy of the Association, shall be *ex-officio* members of the Council.

ARTICLE IV. Vacancies which may occur in the Council shall be filled for the unexpired term or terms by the Association at its next annual meeting.

ARTICLE V. The officers of the Council shall consist of a Chairman, Vice-Chairman, and Secretary, to be elected by ballot annually by the Council. The Secretary may or may not be a member of the Council.

ARTICLE VI. The Council shall be charged with the examination of the credentials of delegates, and the transaction of unfinished business of the Association from one annual meeting to another, and with collecting, arranging, and expediting the business of the Association during the sessions of the annual meeting.

ARTICLE VII. There shall be elected annually by ballot, by the Council, three standing committees of the Council—a Committee on Membership, a Committee on Publication, and a Committee on Finance—to whom shall be referred such duties as are appropriate to their respective functions, as the Council shall direct; they shall report annually to the Council, and at such other times as the Council may direct.

ARTICLE VIII. *Section* 1. The Council shall have charge of the revision of the roll and the publication of the Proceedings.

*Section* 2. The Secretary of the Council shall read at each of its sessions the names of those candidates for membership which have been proposed, when a vote of two-thirds shall be sufficient to recommend them to the Association.

*Section* 3. The Council shall decide upon any objections which may be presented to them (which must be in writing, with the member's name attached), referring to the fitness of the candidates for membership; and no name shall be voted on by the Association without first receiving the approval of the Council.

*Section* 4. The Committee on Membership shall report at each annual meeting of the Council a revised roll of members, with appropriate notices of deceased members.

ARTICLE IX. The Council shall furnish to each member of the Association not in arrears, one copy of the annual publication of the Proceedings, which publication shall contain the correct roll of members, full minutes of the several sittings of the Association, a complete synopsis of the minutes of the Council, the reports of the President and Committees, together with such addresses, scientific papers, discussions, notices of new processes and preparations, as they may deem worthy of insertion, and shall fix the price at which the Proceedings shall be sold.

## CHAPTER VII.

### *Of Committees.*

ARTICLE I. There shall be six Standing Committees, a Committee on Commercial Interests, on the Revision of the Pharmacopœia, each to consist of five members; a Committee on Scientific Papers, a Committee on Prize Essays, and a Committee on Pharmaceutical Legislation and Education, each to consist of three members; and a Committee on Transportation, to consist of nine members.

ARTICLE II. The Committee on Commercial Interests shall be elected by the Section on Commercial Interests. They shall be charged with the work of arranging in advance the business to come before the Section at the next annual meeting. They shall propose each year a subject for discussion at the meetings of the State Associations, and at the following annual meeting of this Association they shall present a report of the action of the State Associations upon the subject proposed.

ARTICLE III. The Committee on Scientific Papers shall be elected by the Section on Scientific Papers. They shall arrange the business of the Section, and shall report, near the close of each annual meeting, a proper number of questions of scientific and practical interest, the answers to which may advance the interests of Pharmacy, and shall procure the acceptance of as many such questions for investigation as may be practicable.

ARTICLE IV. Any person writing a paper for the Association must, to insure its publication in the Proceedings, refer the same, with a synopsis of its contents, to the Committee on Scientific Papers previous to the first session.

ARTICLE V. It shall be the duty of every Standing Committee making a report annually to the Association, in like manner to furnish a copy of the same, together with a synopsis of its contents, to the Committee on Scientific Papers before the first annual session of the Association.

ARTICLE VI. The Committee on Prize Essays, which shall be appointed by the Chairman of the Section on Scientific Papers, shall, within six months after the annual meeting at which the essays are presented, determine which, if any of them, has met the requirements of the founder of the prize. In all other respects they shall be governed by the stipulations expressed by the donor. The decision of the Committee, with such comments upon the successful essay only as they may deem proper, may be published in the Journals of Pharmacy.

ARTICLE VII. The Committee on Pharmaceutical Legislation and Education, which shall be elected by the Section on Pharmaceutical Legislation and Education, shall keep a record of, and compile for reference, the enactments of the different States regulating the practice of pharmacy and the sale of medicines. They shall report to each stated meeting of the Association what legislation on pharmaceutical subjects has occurred during the year. They shall arrange the business of the Section in advance of its meetings, propose suitable subjects for discussion, and shall attend to such duties as may be delegated to them by the Section.

ARTICLE VIII. The Committee on Revision of the United States Pharmacopœia shall be appointed by the President of the Association. It shall be their duty to collect and codify such facts as may serve as a basis of the report to be presented by this Association to the National Convention for revising the Pharmacopœia. It shall collect statistics regarding the frequency with which officinal and non-officinal remedies are

used in legitimate practice, and shall endeavor to ascertain the general wishes and feelings of the profession throughout the country in regard to any desired changes or improvements in the Pharmacopœia.

ARTICLE IX. The Committee on Transportation, which shall be elected by the Council, shall consist of one member each from the cities of Boston, New York, Chicago, St. Louis, Cincinnati, New Orleans, Atlanta, Denver and San Francisco, and in conjunction with the Local Secretary shall arrange for transportation from the different sections of the United States to the place of meeting and return.

## CHAPTER VIII.

### *Of Membership.*

ARTICLE I. Every pharmacist and druggist of good moral and professional standing, whether in business on his own account, retired from business, or employed by another, and those teachers of Pharmacy, Chemistry and Botany, who may be especially interested in Pharmacy and Materia Medica, who, after duly considering the objects of the Association and the obligations of the Constitution and By-Laws, are willing to subscribe to them, are eligible to membership.

ARTICLE II. Any two members of the Association may propose to the Council the name of any person eligible to membership, and if approved, the Council shall recommend the person named to the Association, and post the name in some suitable place in the meeting hall, near the beginning of a session: objection, if any, to be made in writing to the Secretary of the Council, previous to the Association taking any action on the proposition. Near the close of the same, or at a subsequent session, the Association may, by vote, invite such person to become a member, after which his membership shall be completed by his signing the Constitution and By-Laws, and paying the annual contribution for the current year.

ARTICLE III. Every member shall pay in advance to the Treasury the sum of *Five Dollars* as his yearly contribution, and is liable to lose his membership by neglecting to pay said contribution for *three successive years.*

ARTICLE IV. Any member not in arrears to the Association, who shall pay to the Treasurer the sum of $75 during the first year of his connection therewith, or after five years $70, or after ten years $60, or after fifteen years $50, or after twenty years $40, or after twenty-five years $30, or after thirty years $20, or after thirty-five years $10, shall become a life member, and shall be exempt from all future annual contributions.

ARTICLE V. All local organizations of Pharmacists shall be entitled to *five* delegates, as their representatives in the annual meetings, who, *if present*, become members of the Association on signing the Constitution and paying the annual contribution for the current year: Provided, that the provisions of this article shall not be so construed as to reinstate any member whose name shall have been dropped from the roll for non-payment of dues; nor shall any one who has been expelled from the Association be received as a delegate. All credentials should be sent to the Permanent Secretary *at least two weeks* in advance of the annual meeting.

ARTICLE VI. Members shall be entitled, on the payment of *Five Dollars*, to receive from the Treasurer a certificate of membership signed by the President, one Vice-President, Permanent Secretary, and Treasurer.

ARTICLE VII. Persons constitutionally elected to membership become permanent members, and their membership can cease only by resignation, non-payment of dues, or by expulsion, as provided in these By-Laws.

ARTICLE VIII. Resignations of membership shall be made in writing to the Permanent Secretary or Treasurer, but no resignation shall be accepted from any one who is in arrears to the Treasury.

All resignations shall be acknowledged in writing by the officer who receives them, and shall be reported to the Council.

ARTICLE IX. Any member may be expelled for improper conduct, or the violation of the Constitution, By-Laws, or Ethics, adopted by the Association, but no person shall be expelled unless he shall receive for expulsion two-thirds of all the votes cast at some regular session.

ARTICLE X. Pharmacists, chemists, and other scientific men who may be thought worthy the distinction, may be elected honorary members. They shall not, however, be required to contribute to the funds, nor shall they be eligible to hold office or vote at the meetings.

## CHAPTER IX.

### *Of Meetings and Sections.*

ARTICLE I. The meetings shall be held annually: Provided, that in case of failure of this, from any cause, the duty of calling the Association together shall devolve upon the President, or one of the Vice-Presidents, with the advice and consent of the Council.

ARTICLE II. To expedite and render more efficient the work of the Association, three Sections shall be formed, as follows: 1. Scientific Papers; 2. Commercial Interests; 3. Pharmaceutical Legislation and Education.

ARTICLE III. The business of the Association shall be arranged so that the labors of each Section shall be considered only at the session or sessions to which they are especially assigned.

ARTICLE IV. The first, second and last sessions of the annual meeting shall be devoted to the general business of the Association, and sufficient time shall be assigned to the Association at the beginning of all other sessions to read its minutes, act on the report of Council on membership, and receive propositions for amendments to the By-Laws.

ARTICLE V. At the third and fourth sessions the business of the Section on Commercial Interests shall be considered.

ARTICLE VI. The fifth, sixth and seventh sessions shall be devoted to the reading of Scientific Papers and the discussions thereof.

ARTICLE VII. At the eighth and ninth sessions the Section on Pharmaceutical Legislation and Education shall consider the business assigned to that Section.

ARTICLE VIII. A Chairman and Secretary shall be elected by ballot by each Section to serve at the special meeting of said Section. And the minutes of each meeting, together with all documents and papers which belong to each Section, must be placed as soon as possible in the hands of the Permanent Secretary for publication or safe-keeping.

ARTICLE IX. The Chairman of each Section shall preside at each of its meetings, and shall prepare a short address treating upon the subjects connected with his Section, to be read before the Section at the next annual meeting.

ARTICLE X. There shall be elected by each Section a Committee, of which the Chairman of the Section shall be Chairman, to whom shall be delegated the duty of arranging in advance the business to come before the Section at the next annual meeting; these committees in each case becoming Standing Committees of the Association.

ARTICLE XI. The order of business at the first session of each annual meeting shall be as follows:

*Section* 1. Promptly at the time named in the notice issued for the meeting, the President, or in his absence one of the Vice-Presidents, or, in their absence, a President *pro tempore*, shall officiate.

*Section* 2. In the absence of the Permanent Secretary, the President shall appoint a Recording Secretary *pro tempore*, who shall perform the duties of the Permanent Secretary until his arrival.

*Section* 3. Nineteen members shall constitute a quorum for the transaction of business.

*Section* 4. The President's address may then be read, after which the Council shall report the list of properly accredited delegates.

*Section* 5. The Council shall read the names of the candidates for membership, as provided in Section 2, Article VIII., Chapter VI.

*Section* 6. Reports of Committees shall be presented, read by their titles, the synopsis or in full, and laid on the table for future consideration.

*Section* 7. The President shall call the roll of States represented, requesting each State in turn to appoint two members, the persons so selected to act as a Committee to nominate officers for the Association and members of the Council for the ensuing year; in addition to which he shall appoint five members to act with the Committee.

*Section* 8. The minutes of the Council shall be read in full at the annual meeting of the Association, and its acts, if approved, shall be sustained by a vote of the majority of the members present; or, if disapproved by a majority of the members present, their acts shall be revised, so as to be acceptable to the Association.

*Section* 9. A committee of five on time and place of meeting shall be appointed by the President at the first session, they to report at the second session.

*Section* 10. Incidental business may be called up.

ARTICLE XII. The order of business at the second session at each annual meeting shall be as follows:

*Section* 1. The President shall call the Association to order.

*Section* 2. The Secretary shall read the minutes of the preceding session, which may be amended, if necessary, and shall then be approved.

*Section* 3. The Report of the Committee on Nominations shall be read; when the President shall appoint tellers, and the officers nominated shall be balloted for.

*Section* 4. The Council shall present names recommended for membership.

*Section* 5. Reports of Standing Committees shall be read.

*Section* 6. Reports of Special Committees shall be read.

ARTICLE XIII. The order of business for the meetings of the Sections shall be determined by each Section for itself.

ARTICLE XIV. No money shall be appropriated from the Treasury by any of the Sections.

ARTICLE XV. At the last session of the Association the newly elected officers of the Association shall take their respective places.

## CHAPTER X.

### *Of Rules of Order and Debate.*

ARTICLE I. The ordinary rules of parliamentary bodies shall be enforced by the presiding officer, from whose decision, however, appeals may be taken, if required by two members, and the meeting shall thereupon decide without debate.

ARTICLE II. When a question is regularly before the meeting, and under discussion, no motion shall be received but to adjourn, to lay on the table, for the previous question, to postpone to a certain day, to commit or amend, to postpone indefinitely; which several motions have precedence in the order in which they are arranged. A motion to adjourn shall be decided without debate.

ARTICLE III. No member may speak twice on the same subject, except by permission, until every member wishing to speak has spoken.

ARTICLE IV. On the call of any two members, the yeas and nays shall be ordered, when every member shall vote, unless excused by a majority of those present, and the names and manner of voting shall be entered on the minutes.

## CHAPTER XI.

### *Miscellaneous.*

ARTICLE I. In all such points of order as are not noticed in these By-Laws, the Association shall be governed by the established usages in all assemblies governed by parliamentary rules.

ARTICLE II. Every proposition to alter or amend these By-Laws shall be submitted in writing, and may be balloted for at any subsequent session, when, upon receiving the votes of three-fourths of the members present, it shall become a part of the By-Laws.

ARTICLE III. No one or more of these By-Laws shall be suspended.

# SECTION ON SCIENTIFIC PAPERS.

## ORDER OF BUSINESS.

### First Session of the Section (Fifth of the Association).

1st. The Chairman and Secretary assume their respective places.

2d. Reading of the Chairman's address.

3d. Reports of Committees, if there be any to make, and appointment of such new Committees as may appear desirable.

4th. Nominations (but not elections at this sitting) for the new Committee on Scientific Papers. The names of members nominated to be posted in the hall on the adjournment of this session. The election not to take place until after the opening of the next session, when further nominations may also be made if it is deemed desirable.

5th. Reading of Papers and discussions on the subjects brought up.

6th. Adjournment.

### Second Session of the Section (Sixth of the Association).

1st. Reading of Minutes of the previous session.

2d. Election of New Committee on Scientific Papers.

3d. Reports of Committees—Incidental Business.

4th. Reading of Papers.

5th. Adjournment.

### Third Session of the Section (Seventh of the Association).

1st. Reading of Minutes of the previous session.

2d. Reading of Papers.

3d. Installation of New Officers.

4th. Reports of Committees.

5th. New Business.

6th. Reading of Minutes.

7th. Final Adjournment.

# BY-LAWS OF THE COUNCIL.

## CHAPTER I.

ARTICLE I. The Officers of the Council shall consist of a Chairman, Vice-Chairman, and Secretary, who shall be elected by ballot by the Council, to serve one year.

ARTICLE II. They shall be elected and shall assume the duties of their respective offices immediately after the election of the new members of the Council by the Association.

## CHAPTER II.

*Of the Chairman and Vice-Chairman.*

ARTICLE I. The Chairman shall preside at all meetings of the Council; in his absence or on account of inability from any cause, the Vice-Chairman, or, in the absence of both, a Chairman *pro tempore*, shall perform the duties of Chairman.

ARTICLE II. The Chairman of the Council shall confer with the Chairmen of the various special and standing committees of the Association, during its sessions, in order to arrange and expedite the business of the Association.

## CHAPTER III.

*Of the Secretary.*

ARTICLE I. The Secretary shall keep fair and correct minutes of the proceedings of the meetings, and carefully preserve all reports and papers of every description received by the Council. He shall receive an annual salary of $50.

ARTICLE II. He shall post in a conspicuous place in the meeting-room the names of the applicants for membership.

ARTICLE III. He shall read all the papers handed him by the Chairman for that purpose; shall call and record the yeas and nays whenever they are required to be called; he shall notify the Chairman of every special committee of his appointment, giving him a list of his colleagues, and stating the business upon which the committee is to act, and shall notify every member of the time and place of each meeting.

## CHAPTER IV.

*Committee on Membership.*

ARTICLE I. The Committee on Membership shall consist of five members of the Council, to be elected annually by ballot. The Permanent Secretary and the Treasurer of the Association shall be *ex-officio* members of this committee. The committee shall elect their chairman immediately after their election by the Council.

ARTICLE II. The Committee on Membership shall be charged with the duty of keeping a correct list of the members of the Association, and shall present the list of applicants for membership who have complied with the requirements of the By-Laws of the Assoctation, to the Council.

ARTICLE III. They shall furnish appropriate obituary notices of deceased members for publication in the Proceedings.

ARTICLE IV. The Secretary of the Committee shall receive an annual salary of $150.

## CHAPTER V.

### *Of Committee on Publication.*

ARTICLE I. The Committee on Publication shall consist of five members, to be elected by ballot by the Council, who shall elect their chairman immediately after their own election by the Council.

ARTICLE II. The Committee on Publication shall have charge of the publication and distribution of the Proceedings.

## CHAPTER VI.

### *Of Committee on Finance.*

ARTICLE I. The Committee on Finance shall consist of three members. They shall audit all bills of the Association, and orders on the Treasurer for the payment of bills shall not be issued without the consent of the Finance Committee.

## CHAPTER VII.

### *Of the Centennial Fund.*

ARTICLE I. A Committee on the Centennial Fund shall be formed, consisting of the President or one of the Vice-Presidents of the Association, of the Chairman of the Committee on Finance, and of the Permanent Secretary. They shall receive applications in writing from members for grants from the interest derived from the Centennial Fund, the applications to be accompanied by a statement of the investigation to be made, and of the amount and cost of material required—it being understood that the results of the investigation, together with a full report thereon, be laid before the annual meeting of the Association.

ARTICLE II. The Committee shall consider these applications, and at as early a date as possible shall report to the Council an outline of the proposed investigations, together with such recommendations of grants from the available funds as they may deem proper.

ARTICLE III. The Council shall decide upon these recommendations, and in case the grants be approved, the Chairman of the Council shall direct orders to be drawn upon the Treasurer in favor of those members to whom grants have been made.

## CHAPTER VIII.

*Of Meetings.*

ARTICLE I. The Council shall meet previous to the assembling of the Association and at such other times as they may adjourn to, or at the call of the Chairman.

ARTICLE II. On the written application of three members to the Chairman of the Council, a special meeting shall be called.

ARTICLE III. Five members of the Council shall constitute a quorum.

ARTICLE IV. The order of business at the first session of the Council shall be as follows:

1. Organization by the election of the Chairman, Vice-Chairman, and Secretary.
2. Election of the Standing Committees of Council, as follows:

*a.* Committee on Membership, consisting of five members of the Council, the Permanent Secretary and Treasurer.

*b.* Committee on Finance, three members.

*c.* Committee on Publication, five members.

*d.* Committee on Centennial Fund, three members.

3. Unfinished and deferred business from the meeting of the last Council, or such business as is especially referred to the Council from the Association.
4. The reading of the names of new members as provided in the By-Laws.
5. Reading of reports and appointment of committees.
6. New business.
7. Adjournment—and before the final adjournment, the minutes of the last session shall be read and approved.

## CHAPTER IX.

*Miscellaneous.*

ARTICLE I. Three members of any of the Standing Committees shall constitute a quorum for the transaction of business.

ARTICLE II. In all questions arising before the Council or its Committees, and which can be disposed of by a positive or negative vote, the Chairman of the Council, or the Chairman of the Committee, may take the vote of their respective bodies in writing, and the same shall have the same force and effect as if the members had been personally present. The ayes and nays of such votes taken by the Council shall be entered upon the minutes.

ARTICLE III. Every proposition to alter or amend these By-Laws shall be submitted in writing, and may be ballotted for at the next session of the Council, when upon receiving the votes of three-fourths of the members present, it shall becomn a part of these By-Laws.

# FORM OF APPLICATION FOR MEMBERSHIP.

APPROVING of the objects of the American Pharmaceutical Association, and having read its Constitution and By-Laws, I hereby signify my approval of the same, and subscribe to them. I also enclose the annual contribution, five dollars, for the first year of my membership.

Name in full.................... ..............................

Number and Street..............................................

Town and State..................................................

Recommended by the undersigned two members in good standing:

..............................................

..............................................

# FORMS OF PROPOSITIONS AND OF COMPLETING MEMBERSHIP IN ACCORDANCE WITH CHAPTER VIII., ARTICLE II. OF THE BY-LAWS.

THE undersigned members in good standing, being personally acquainted with the following persons eligible to membership in accordance with Chapter VIII., Article I. of the By-Laws, testify to their moral character, their skill as practical druggists and pharmacists, and their professional probity and good standing, and they recommend them for membership in the American Pharmaceutical Association.

NAMES OF CANDIDATES. ADDRESS.

Proposed by..................................................

..................................................

APPROVING of the objects of the American Pharmaceutical Association, and having read its Constitution and By-Laws, I hereby signify my approval of the same, and subscribe to them, and enclose the annual contribution, five dollars, for the current year.

Name in full..................................................

Date ..........................................................

Address........................................................

..............................

To be sent to Geo. W. Kennedy, Secretary Committee on Membership A. P. A., Pottsville, Penn.

# GENERAL RULES OF FINANCE.

## ADOPTED 1883, AMENDED 1885, 1887, 1888.

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*First,* The Treasurer shall deposit all moneys received by him, except those belonging to the various "Funds," with some reliable banking company, where said money may be drawing interest for the benefit of the Association, said banking company to be designated by the Finance Committee, and approved by the Council.

*Second,* Said money shall be deposited in the name of the American Pharmaceutical Association, and all checks shall be drawn by the Treasurer, and shall be countersigned by the Chairman of the Council.

*Third,* All bills due by the Association shall be paid by numbered checks on said banking company, the checks, when returned to the Treasurer, to be attached to the several vouchers.

*Fourth,* The Treasurer shall make a deposit in the bank whenever the money in his hands shall amount to fifty dollars.

*Fifth,* The Chairman of the Council shall be the custodian of the bonds and saving-bank-books, representing the several Funds belonging to the Association; and bonds and bank-books shall be in the name of the Treasurer, and the accounts of the same shall be kept by him; duplicate accounts to be kept by the Chairman of the Council, who shall make an annual report of the same to the Association.

*Sixth,* There shall be annually appointed, by the Council, an Auditing Committee, this Committee to consist of three members residing in or near the same city or town, the Chairman to be a member of the Finance Committee.

*Seventh,* The Treasurer shall balance his books July 1st of each year, and shall make out, previous to the fifteenth day of July following, his annual report for the financial year just closed.

*Eighth,* The Treasurer having thus balanced his books and made out his report, shall forward all his books, accounts, vouchers, etc., with the report, to the Chairman of the Auditing Committee, at such time and place in July of each year as said Chairman may direct.

The Chairman of the Council shall forward to the Chairman of the Auditing Committee, at the same time and place, the bonds, saving-bank books, and accounts of the same that may be in his hands.

*Ninth,* Said books, accounts, vouchers, etc., shall be returned to the Treasurer, and said bonds, savings-bank books and accounts of the same to the Chairman of the Council, all within two weeks of the date of their reception by the Chairman of the Auditing Committee.

*Tenth,* There shall be a meeting of the Auditing Committee in July of each year, and it shall be the duty of said Committee, at such meeting, to carefully examine all the books, accounts, vouchers, funds, etc., etc., received by them; and previous to the 1st day of August following, to make a report thereon, in writing, to the Chairman of the Council.

*Eleventh,* The expense of the bond of the Treasurer, given by a Trust Company, shall be paid for from the Treasury.

*Twelfth,* The Treasurer shall furnish with his annual report an alphabetical list of the names of the members from whom he has received money for dues and certificates during the financial year, for publication in the Proceedings.

# ROLL OF MEMBERS.

## HONORARY MEMBERS.

### FOREIGN COUNTRIES.

#### AUSTRIA.

Anton von Waldheim, *Vienna*, 1871.

#### BELGIUM.

A. T. De Meyer, *Brussels*, 1868.
Norbert Gille, *Brussels*, 1868.

#### ENGLAND.

Dr. John Attfield, *London*, 1871.
Dr. Robert Bentley, *London*, 1872.
Michael Carteighe, *London*, 1882.
Thomas Greenish, *London*, 1882.
Joseph Ince, *London*, 1882.
Richard Reynolds, *Leeds*, 1882.
Geo. F. Schacht, *Clifton*, *Bristol*, 1882.

#### FRANCE.

Dr. G. Planchon, *Paris*, 1877.

#### GERMANY.

Dr. Christian Brunnengraeber, *Rostock*, 1882.
Dr. Hermann Hager, *Pulvermühle bei Fürstenberg*, 1868.
Dr. Carl Schacht, *Berlin*, 1882.
Dr. Edward Schaer, *Strassburg*, 1877.

#### NETHERLANDS.

Dr. J. E. De Vrij, *Hague*, 1871.

#### RUSSIA.

Dr. G. Dragendorff, *Dorpat*, 1868.
J. von Martenson, *St. Petersburg*, 1882.

#### SWITZERLAND.

Dr. F. A. Flückiger, *Berne*, 1868.

# ACTIVE MEMBERS.

**Members are requested to report any inaccuracies in these lists, and to notify the Secretary and Treasurer of all changes of address.**

(The names of Life Members in SMALL CAPS. Names of Life Members under the old Constitution in *italics*.

## UNITED STATES OF AMERICA.

### ALABAMA.

*Birmingham.*

Hughes, James William ............1891
Miller, Charles Gough ............1889
Norton, Edward Benjamin ............1888

*Mobile.*

Brown, Albert Edward ............1887
Candidus, Philip Charles ............1857
McAfee, John James ............1890
Mohr, Charles ............1871
Punch, William Francis ............1874
Tucker, Mosely Fleming ............1888
Van Antwerp, Andrew ............1890
Van Antwerp, Garet ............1880

*Montgomery.*

Knabe, Gustavus Alexander ............1876

*Selma.*

Crum, John Darius ............1892
Galt, Edward Pegram ............1883

*Waverly.*

Willis, John Blalock ............1891

*Whistler.*

Bailey, Alexander Calder ............1891

### ARIZONA.

*Phœnix, Maricopa Co.*

Eschman, Clemens Louis ............1889

### ARKANSAS.

*Camden.*

Morgan, Aylmer Lee ............1890

*Fort Smith.*

Schaap, John ............1890

*Hope.*

Gibson, John S. ............1891

*Little Rock.*

Bond, John Barnitz ............1883
Gibson, James Edwin ............1887
Jungkind, John August ............1887

*Pine Bluff.*

Dewoody, William Lawrence ............1887
Valliant, George Enos ............1891

*Russellville.*

Kerr, William Whitman ............1887

*Searcy.*

Robertson, Felix Otey ............1890

*Van Buren.*

Kerr, Frank Gault ............1890

### CALIFORNIA.

*Alameda, Alameda Co.*

Elbe, Constantine Berthold ............1877

*Angel's Camp, Calaveras Co.*

Scribner, John Cairnes ............1889

*Bakersfield, Kern Co.*

Drury, John Stimson ............1889

*Centreville, Alameda Co.*

Lernhart, August ............1889

*Eureka, Humboldt Bay.*

Powell, Robert Baldwin ............1880

*Fruit Vale, Alameda Co.*

Neppach, Stephen Alfred ............1889

*Haywards, Alameda Co.*

Hassler, Alfred Jacob ............1891
Hood, John William ............1891

*Los Angeles.*

Rives, Edward B. .................. 1889

*Marysville, Yuba Co.*

Flint, John Henry .................. 1889

*Monterey.*

Hilby, Francis Martin .................. 1886

*Oakland.*

Flint, George Benjamin .................. 1889
Kirkland, Derwentwater .................. 1889
Maclise, James .................. 1889
Melvin, Samuel Houston .................. 1889
Smith, William Clay .................. 1889

*Oroville, Butte Co.*

Cummins, J. Wirt .................. 1891
Ekman, Nils Adolf .................. 1889
Green, Robert Moore .................. 1889

*Pasadena.*

Bley, Alphonso Albert Willetts .................. 1889

*Sacramento.*

Helke, William Ludwig .................. 1889
Ray, Frederick Edwards .................. 1889

*San Francisco.*

Bacon, Gaston Ernest .................. 1887
Bayly, Charles Alfred .................. 1889
Beckett, Frederick Arthur .................. 1885
Brackett, Aurick Smith .................. 1868
Bradley, James Walker .................. 1889
Calvert, John .................. 1870
Dawson, John Henry .................. 1882
Devine, John .................. 1887
Hunt, Denis Denvin .................. 1889
Joy, Edwin Wolcott .................. 1882
Keil, Frederick Charles Christian .................. 1889
*Moffit, Thomas Sabatier* .................. 1861
Runyon, Edward Wheelock .................. 1875
Schmidt, Valentine .................. 1887
Searby, William Martin .................. 1882
Steele, James Gurden .................. 1859
Welch, Willard Choate, Jr. .................. 1889
Wenzell, William Theodore .................. 1870
White, Richard Edward .................. 1889

*Santa Barbara, Santa Barbara Co.*

Gutierrez, Antonio Gabriel .................. 1889

*Santa Clara.*

Oberdeener, Samuel .................. 1889

*Santa Cruz.*

Fay, Hamilton .................. 1889
Rumsey, Samuel Louis .................. 1876

*Selma, Fresno Co.*

McCartney, Winfield Scott .................. 1889

*Vacaville.*

Miller, James Monroe .................. 1889

*Vallejo, Solano Co.*

Topley, James .................. 1869

COLORADO.

*Central City.*

Best, John .................. 1866
Davies, Llewelyn Powell .................. 1891

*Denver.*

Beitenman, William Wallace .................. 1888
Black, John Reid .................. 1891
Ford, Charles Mangan .................. 1887
Huecker, John .................. 1891
Kline, Charles Sol. .................. 1891
Kochan, John .................. 1888
Kostitch, Stephen Theodore .................. 1889
Long, John C. .................. 1892
Lord, Frank Jotham .................. 1889
Price, Charles Asbury .................. 1889
Scholtz, Edmund Louis .................. 1881
Stebbins, Harry Frank .................. 1891
Steinhauer, Frederick .................. 1881
Walbrach, Arthur .................. 1881

*Durango.*

Strater, Henry Herman .................. 1891

*Glenwood Springs, Garfield Co.*

Ewing, Frederic Charles .................. 1889

*Lyons.*

Crona, Sixtus Edward Seine .................. 1885

*South Denver.*

Soetje, Edward Conrad .................. 1888
Thurber, Almon Russel .................. 1880

COLUMBIA, DISTRICT OF.

*Washington.*

Boyd, George Washington .................. 1883
Butler, P. H. .................. 1892
Christiani, Charles .................. 1874
Criswell, Francis McClure .................. 1892
Duckett, Walter G. .................. 1876
Earl, Charles .................. 1891
Halleck, William Edward .................. 1890

Hilton, Samuel Louis ............... 1890
Hodges, John Walter. ............... 1891
Hutton, Harry Dubant ............... 1891
Johnston, Henry Augustus .......... 1883
Lockhart, George Bradfield .......... 1883
Major, John Richards ............... 1873
Martin, John Charles ............... 1883
McComas, Percy Grant ............... 1892
MILBURN, JOHN ALEXANDER ........ 1858
Nattans, Arthur ..................... 1883
Schafhirt, Adolph Julian ............. 1876
Simms, Giles Green Craycroft ........ 1860
Thompson, William Scott ........... 1871
Walton, Joseph Richardson .......... 1883
Wehrly, Thomas McAleer ........... 1883

## CONNECTICUT.

*Ansonia.*

Bristol, Charles Edward ............ 1880
Smith, Samuel Wheeler ............. 1889

*Birmingham.*

Hogan, John Joseph ................. 1890

*Bridgeport.*

Fisher, Elbert Ellsworth ............ 1892

*Hartford.*

Chapin, Frederick Hastings ......... 1880
Goodrich, Stephen .................. 1875
Goodwin, Lester Henry ............ 1875
Newton, Philo Woodhouse .......... 1892
Rapelye, Charles Andrew ........... 1876
Shannon, Thomas Ross Alvin ........ 1892
Stoughton, Dwight George .......... 1890
Tracy, David Wallace ............... 1892
Williams, John Kirby ............... 1875

*Litchfield.*

Gates, Howard Eugene ............. 1873

*Middletown.*

Pitt, John Richard, Jr. .............. 1872

*Naugatuck.*

May, James Oscar .................. 1875

*New Britain.*

Perkins, Charles William ............ 1892

*New Canaan.*

Winters, John Henry ............... 1888

*New Haven.*

Dimock, Robert Hemphill .......... 1889
Francis, Walter Russell ............. 1882
Gessner, Emil Adolph ............... 1878
Spalding, Warren Alphonso ......... 1876
Sperry, Herman Jay ................. 1880
Wood, Alonzo Felton, Jr. ............ 1890
Wood, James Prior ................. 1890

*New London.*

Huntington, William Hunter ........ 1891
Nichols, John Cutter ............... 1886

*Norwich.*

Osgood, Hugh Henry ............... 1875
Sevin, Nathan Douglas ............. 1875
Travis, J. Walton ................... 1888

*Putnam.*

Dresser, George Edward ............ 1886

*Stamford.*

Haight, William Bogardus .......... 1872

*Taftville.*

Ryan, Henry ....................... 1892

*Thomaston.*

Williams, Charles Fish ............. 1888

*Thompsonville, Hartford Co.*

Smith, Edward Newton ............. 1885
Steele, George Robert .............. 1892

*Waterbury.*

Bossidy, Bartholomew .............. 1889
Munson, Luzerne Ithiel ............ 1872
Wilcox, Frederick ................... 1878
Woodruff, Roderick Samuel ......... 1876

*West Winsted.*

Phelps, Dwight ..................... 1873

*Willimantic.*

Wilson, Frank Milton ............... 1883

## DELAWARE.

*Wilmington.*

Beetem, Jacob Samuel .............. 1888
Belt, James Ferris ................... 1892
Belt, Zedekiah James .............. 1876
Harvey, John Marsh ............... 1890
Smith, Frank Roop ................ 1890
Smith, Linton ...................... 1870
Stewart, Francis Edward ........... 1884
Watson, Herbert Kennedy .......... 1888

## FLORIDA.

*Apopka, Orange Co.*

*Kent, Robert Restieaux*..............1855

*Fort George.*

*Rollin, John Francis*..............1859

*Jacksonville.*

Aird, William..............1887
Dell, William Amos..............1890
Emerson, Hermann Lincoln..............1892
Hughes, George..............1887
Lightstone, William Henry..............1891
Wooldridge, Napoleon..............1883

*Key West.*

Mendoza, Francis Felix..............1891
Plummer, Joseph Wellesley V. R..............1892

*Myers.*

Williams, Edward Marshall..............1892

*Ocala.*

Delouest, Edward..............1890

*Pensacola.*

Cushman, Henry Clay..............1887

*St. Augustine.*

Smith, Lauriston Stephen..............1892

*Tallahassee.*

Schrader, Herman Von Roden..............1891

*Tampa.*

Harris, Chester C...............1892
Leonardi, Sydney Beauregard..............1890

## GEORGIA.

*Atlanta.*

Avary, Moody Burt..............1892
Cronheim, Solomon..............1892
Dunwody, Richard Gaillard..............1891
Schumann, Theodore..............1860
Sharp, Harry..............1890
Tyner, Charles Olando..............1892
Watson, Sidney Powell..............1887
Watson, William Simpson..............1892

*Augusta.*

Durban, Sebastian Charles..............1883
LAND, ROBERT HENRY..............1859

*Columbus.*

Wheat, Eli Mabry..............1892

*Greenville.*

Tigner, James Ogletree..............1890

*Jackson.*

Wagner, William I...............1892

*La Grange.*

Slack, Henry Richmond, Jr..............1890

*Macon.*

Brunner, Norman Isaac..............1878
Cheatham, Thomas Alexander..............1890
Hunt, Leonard Washington..............1878
Ingalls, John..............1876
*McConville, Thomas Aloysius*..............1864

*Milledgeville.*

Case, George Daniel..............1891

*Summerville.*

Arrington, Homer Houston..............1892

*Thomasville.*

Bondurant, Charles Scott..............1888
Thomas, Robert, Jr..............1888

## IDAHO.

*Caldwell.*

Smithson, David Elmer..............1890

*Murray, Shoshone Co.*

Ingalls, Albert Orfila..............1885

## ILLINOIS.

*Arcola.*

Boyd, William Porter..............1892

*Aurora.*

Staudt, Louis Carl..............1890

*Bloomington.*

Green, Hamer Herschel..............1892

*Bradford, Stark Co.*

Plummer, David Gorham..............1869

*Camp Point, Adams Co.*

Bartells, George Case..............1881

*Carlinville, Macoupin Co.*

Loehr, Theodore Christian..............1888

*Chicago.*

Bartlett, Nicholas Gray..............1864
Behrens, Paul Johannes Heinrich..............1888

Bell, John Irving .................... 1890
BIROTH, HENRY .................... 1865
Bishop, Samuel Edward .............. 1890
Blocki, William Frederick ........... 1863
Bodemann, Wilhelm ................ 1887
Button, Charles Edwin .............. 1881
Conrad, John ...................... 1887
Dorner, Emil August ................ 1892
Dyche, David Raper ................. 1892
EBERT, ALBERT ETHELBERT ......... 1864
Fechter, Arthur Emil ............... 1892
Fischer, Oscar Frederick ............ 1892
Fleischer, Adolph Theodore ......... 1888
Forsyth, William K. ................. 1892
Frerkson, Richard Christopher ....... 1888
FULLER, OLIVER FRANKLIN .......... 1869
*Gale, Edwin Oscar* ................ 1857
*Gale, William Henry* ............... 1857
Grassly, Charles William ............ 1884
Gray, William ...................... 1892
Hallberg, Carl Swante Nicanor ....... 1879
Hartwig, Charles Ferdinand .......... 1881
Hartwig, Otto Julius ................ 1892
Hogan, Louis Cass ................. 1890
Hogey, Julius Henry ................ 1880
Houghton, Harry James ............. 1891
Jamieson, Thomas Nevin ........... 1888
Kadlec, Lawrence Wesley ........... 1880
Kirchgasser, William Charles ........ 1888
Knudsen, Rudolph Hans ............ 1892
Leenheer, Bastian .................. 1891
Lord, Thomas ...................... 1882
Martin, Hugo William Conrad ....... 1881
Miner, Maurice Ashbel ............. 1880
Morland, Robert Lawson ............ 1892
Morris, William Gabriel ............ 1890
Oglesby, George Daniel ............. 1891
Oldberg, Oscar ..................... 1873
Parsons, John ...................... 1865
Patterson, Theodore Henry ......... 1869
Porter, Millett Nathan .............. 1892
Puckner, William August ........... 1888
Rhode, Rudolph Ernst .............. 1887
Sargent, Ezekiel Herbert ........... 1864
Scherer, Andrew .................... 1884
Schmidt, Florian Charles ............ 1882
Schmidt, Frederick Michael ......... 1887
Schwab, Leslie Watts ............... 1892
Scott, James McDonald ............. 1892
Sempill, Walter Morrison ........... 1892
Smith, Benjamin Franklin ........... 1892
Truax, Charles ..................... 1882
Weber, Eugene ..................... 1892
Wheeler, Charles Gilbert ............ 1892
WHITFIELD, THOMAS ............... 1865
WOLTERSDORF, LOUIS .............. 1865
Zahn, Emil Augustus ................ 1881

*Decatur.*

Smith, Alexander Henry ............ 1888

*East St. Louis.*

Heller, George Gordon ............. 1890
Knoebel, Thomas .................. 1892

*El Paso, Woodford Co.*

Strathman, Charles August .......... 1888

*Grand Crossing.*

Pattison, Charles Henry ............ 1891

*Highland.*

Mueller, Adolphus .................. 1871

*La Salle.*

Adamick, Gustave Hattenhauer ...... 1891

*Lincoln.*

Reed, Charles Cornean ............. 1892

*Moline.*

Sohrbeck, George Henry ........... 1888

*Momence.*

Culver, Anson Allen ............... 1890

*Pekin.*

Ehrlicher, Henry Michael ........... 1892

*Peoria.*

Benton, Wilber Merritt ............. 1888
Zimmermann, Charles .............. 1881

*Peru, La Salle Co.*

Hattenhauer, Robert Christopher .... 1881

*Saybrook.*

Travis, Miles Beaty ................ 1889

*Streator.*

Higby, William Herbert ............ 1892

## INDIAN TERRITORY.

*Eufaula.*

Moore, Charles Gates .............. 1892

*Wagoner.*

Beardsley, Joseph Laurence ......... 1892

## INDIANA.

*Columbus.*

Stahlhuth, Ernst Henry William......1887

*Evansville.*

Schlaepfer, Henry John ............1879

*Fairmount.*

Edwards, Nathan Wilson ...........1879

*Indianapolis.*

Carter, Frank Hahneman...........1891
Cox, John Thomas.................1892
Dill, John Byron..................1878
Eberhardt, Ernest Godlove..........1887
Eichrodt, Charles William...........1892
Field, Claud......................1890
Frauer, Herman Emanuel...........1881
Hurty, John Newell................1882
Lambert, John Albert ..............1879
Leist, Jacob Lawrence.............1881
Lilly, Eli .........................1878
Lilly, Josiah Kirby.................1890
Pfafflin, Henry Adolph.............1892
Shake, Homer C..................1892
Sloan, George White...............1857
Zimmer, Harry Edgar ..............1892

*Jeffersonville.*

Loomis, John Clarence .............1876

*Lafayette.*

Green, Arthur Lawrence............1884

*La Porte.*

Meissner, Frederick William, Jr......1890

*Murray.*

Birchfield, Wellington W............1891

*New Albany.*

Knoefel, August...................1879

*Rockport, Spencer Co.*

Anderson, Charles Burnett ..........1891

*Seymour.*

Andrews, Josiah Harding...........1879

*South Bend.*

Eliel, Leo ........................1882

*Terre Haute.*

Baur, Jacob.......................1879

## IOWA.

*Chariton.*

Yocum, Albert Lee.................1892

*Clinton.*

Apel, Frederick Edmund.........1892
Majer, Oscar......................1880

*Davenport.*

Ballard, John Winthrop ............1871
Harrison, Jacob Hugh..............1883

*Decorah.*

Weiser, Emilius Ilgenfritz...........1880

*Des Moines.*

Judisch, George ...................1890
Macy, Sherman Riley ............. 1891

*Dubuque.*

Hervey, James .....................1892
Ruete, Theodore William...........1870
Torbert, Willard Horatio ...........1887

*Fort Dodge.*

Oleson, Olaf Martin ................1877

*Fort Madison.*

Schafer, George Henry .............1871

*Iowa City.*

Boerner, Emil Louis ................1877

*Marshalltown.*

Upson, Rosa .......................1887

*Monticello.*

Tiarks, Hermann ..................1876

*Muscatine.*

Braunwarth, Alice Louisa...........1892
Krehe, John Theodor ..............1884

*Oskaloosa.*

Pickett, John Harvey ..............1887

*Prairie City.*

Johnson, Frank Wyatt..............1892

*Sioux City.*

Arnold, Charles Frederick ..........1891
Crady, Edward Edmond ............1892
Moore, Silas Harwood..............1880
More, Arthur James................1881
Scherling, Gustav..................1884

*Stuart.*

Treat, Joseph Augustus.............1885

*Tipton.*

Patton, Joseph ....................1892

*Waterloo.*

Wangler, Conrad David............1876

## KANSAS.

*Atchison.*

Noll, Mathias............1891

*Coldwater.*

Sombart, John Edward............1881

*Galena.*

Enterkine, James Edward............1892

*Gypsum City, Saline Co.*

Schmitter, Jonathan............1892

*Hiawatha.*

Miner, Mary Olds............1892

*Lawrence.*

Leis, George............1869
Moore, John Thomas............1888
Raymond, Harry Legate............1891
Sayre, Lucius Elmer............1883

*Leavenworth.*

Brown, Robert J............1862
Mehl, Henry William............1892

*Liberal.*

Smith, George Sylvester............1892

*Ottawa.*

Becker, Charles Louis............1892

*Peabody.*

Roberts, Daniel John............1881

*Perry, Jefferson Co.*

Spangler, Henry William............1888

*Salina.*

Seitz, Oscar............1881

*Topeka.*

Merrell, Ashbel Hill............1884
Washburn, Harry Munroe............1890

## KENTUCKY.

*Anchorage.*

Haeusgen, Henry Otto............1888

*Carrollton.*

Geier, Oscar William............1880

*Covington.*

Auf'mwasser, Hugo William............1892
Pieck, Edward Ludwig............1887
Zwick, George Albert............1874

*Flemingsburg.*

Reynolds, John Jefferson............1876

*Frankfort.*

Averill, William Henry............1874
Gayle, John William............1891

*Louisville.*

Barnum, Joseph Powers............1887
Beckmann, Oscar Albert............1879
Colgan, John............1867
Constantine, Edward Richard............1891
Diehl, Conrad Lewis............1863
Dilly, Oscar Charles............1888
Fischer, Phil............1883
Fowler, Joseph William............1890
Jones, Simon Newton............1870
KESSLER, EDWARD FREDERICK............1879
Maisch, Henry Charles Christian............1885
Mueller, Otto Edward............1888
Newman, George Abner............1866
Petsche, Franz Fred. Bismarck Wilh............1892
Peyton, Robert Docker............1887
Pfingst, Edward Charles............1874
PFINGST, FERDINAND JOHN............1867
Rademaker, Hermann Henry............1879
Renz, Frederick Jacob............1883
Rogers, Wiley............1874
Scheffer, Emil............1872
Schiemann, Edward Bernard............1880
Schoettlin, Albert John............1882
Snyder, Robert Johnson............1887

*Somerset.*

Porter, Chilton Scott............1882

*Uniontown.*

Hardigg, William Leopold............1881

## LOUISIANA.

*Baton Rouge.*

Boisvert, Pierre............1891
Brooks, Claude Morley............1891

*Bayou Goula.*

Viallon, Paul Louis............1870

*Bayou Sara.*

Kilbourne, Lewis Perkins............1891

*Brusby Landing.*

Babin, John Ephrem................1891

*Eugenia.*

Donaldson, Pierre Armand......... 1891

*Franklin.*

Frere, Alexander Gabriel............1882

*Houma.*

Fraisse, Louis Americus.............1891

*Minden.*

Goodwill..........................1891

*New Iberia.*

Lee, Charles Hill ..................1891
LEE, JAMES AUGUSTIN..............1856

*New Orleans.*

Abbott, Louis Lee..................1891
Albrecht, Joseph...................1891
Angell, Richard...................1891
Bogel, William George Henry.......1891
Borrell, Godfrey....................1891
Brand, Erich.......................1888
Breslin, Michael Thomas............1891
Brunswig, Lucien Napoleon..........1887
Chalin, Louis Fisk..................1887
Cluverius, Wat Tyler...............1891
Dejan, John Baptist George..........1891
Duckert, Louis August..............1891
Even, Charles.....................1891
Finlay, Alexander Kirkwood.........1883
Girling, Robert Nash...............1891
Godbold, Fabius Chapman ..........1887
Grambois, Augustin................1891
Graner, Albert....................1891
Graner, William ...................1891
Grigsby, Robert Lee...............1891
Hall, Charles Knap................1887
Helmann, Otto.....................1891
Hubert, Ernest ....................1891
Johnson, John.....................1887
Keppler, Charles Lewis.............1891
Keppler, Christian Lewis............1882
Lalmant, Eugene ...................1891
Lavigne, Jean Baptist...............1891
Legendre, Joseph Amilcar...........1891
Lehman, John Wesley...............1891
Lyons, Isaac Luria..................1875
Mattingly, George James............1891
May, Eugene......................1891
Metz, Abraham Louis ..............1887
Otto, John Nicholas Washington.....1891
Robin, Oscar......................1887
Rudolf, Mrs. Eliza.................1887
Seeman, Charles Frederick ..........1891
Siekman, Ivan Francis..............1891
Stendel, Julius Guthardt ...........1891
Storck, Jacob Ambrose .............1891
Taylor, Walter Thomas.............1891
Tuma, Bruno Ottokar Camillo.......1891
Wunderlich, Edward...............1891

*Plaquemine.*

Hiriart, Sebastian...................1891

*Port Allen.*

Charroppin, Emile Lafond..........1891

*Zachary.*

Craig, John William ...............1891

## MAINE.

*Auburn.*

Robinson, William Allen ............1892

*Augusta.*

Partridge, Charles Kimball..........1867

*Bangor.*

Harlow, Noah Sparhawk ............1859
Sweet, Caldwell ....................1881

*Bath.*

Anderson, Samuel .................1876

*Belfast.*

Moody, Richard Henry.............1876

*Biddeford.*

Boynton, Herschel.................1875

*Danforth.*

Porter, Martin L...................1892

*Ellsworth.*

Parcher, George Asa ...............1875

*Lewiston.*

Moulton, Daniel Pierce.............1891
Wakefield, Seth David.............1892

*Pittsfield.*

Libby, Henry Fitzgerald............1882

*Portland.*

*Cummings, Henry Thornton*........1853

Frye, George Carlton ................ 1879
Hay, Edward Allston ................ 1889
*Hay, Henry Homer* ................ 1867
Illsley, George Whitfield Barrows ..... 1891
Perkins, Benjamin Abbott ............ 1878

*Windham.*

Rand, Daniel Moulton .............. 1892

## MARYLAND.

*Baltimore.*

*Baxley, Jackson Brown* ............ 1856
Beck, Charles ...................... 1890
Brack, Charles Emil ................ 1876
Burrough, Horace ................... 1883
Caspari, Charles, Jr. ............... 1883
Culbreth, David Marvel Reynolds .... 1883
Dohme, Alfred Robert Louis ........ 1891
Dohme, Charles Emile .............. 1863
Dohme, Louis ...................... 1859
Edwards, William Fletcher ......... 1883
Elliott, Henry Alexander ........... 1859
Emich, Columbus Valentine ........ 1863
Frames, John Fuller ............... 1890
Gilpin, Henry Brooke .............. 1889
Gosman, Adam John ................ 1870
Hancock, John Francis ............. 1863
Hancock, John Henry .............. 1870
Hynson, Henry Parr ................ 1890
Jennings, Nathaniel Hynson ........ 1857
Lauer, Michael John ............... 1865
*Perkins, Elisha Henry* ............. 1857
*Russell, Eugene James* ............. 1856
Schulze, Louis .................... 1892
*Sharp, Alpheus Phineas* ............ 1855
Simon, William .................... 1885
Thompson, William Silver .......... 1856
Thomsen, John Jacob, Jr. ........... 1883
Webber, Joseph Le Roy ............ 1886
Westcott, James Walling ........... 1890
WINKELMANN, JOHN HENRY ....... 1864

*Chestertown.*

Stam, Colin Ferguson .............. 1882

*Cumberland.*

Herman, John George .............. 1878
Shriver, Henry .................... 1876
Shryer, Thomas Wilson ............. 1875

*Frederick City.*

Schley, Steiner .................... 1878

*Hagerstown.*

Winter, Jonas ...................... 1863

## MASSACHUSETTS.

*Abington.*

Dunham, Henry Bristol ............. 1892

*Amesbury.*

Dufault, Hilaire .................. 1892
Trudel, Jacques Joseph ............. 1892

*Andover.*

Parker, George Hawkins ............ 1874

*Boston.*

Baker, Frederick Warren Kidder ..... 1892
Bartlet, William Williams ........... 1875
Bassett, Charles Harrison ........... 1867
Boyden, Edward Cleveland .......... 1874
Brooks, Frederick Pratt ............ 1891
*Burnett, Joseph* .................... 1852
Burnham, Alfred Augustus, Jr. ...... 1891
CANNING, HENRY .................. 1865
Capper, William Ernest ............. 1892
Carrol, Edward .................... 1892
Chapin, William Arms .............. 1880
Cobb, George Washington .......... 1892
Colton, James Byers ............... 1865
Copeland, Sidney Fred .............. 1892
Cramer, Max ...................... 1881
CUTLER, EDWARD WALDO .......... 1859
*Doliber, Thomas* ................... 1859
DRURY, LINUS DANA ............... 1871
Durkee, William Carley ............ 1885
Ernst, Frank Frederick ............. 1891
Gammon, Irving Parker ............. 1891
Gilbert, C. A ...................... 1891
Godding, John Granville ............ 1875
Gorman, John Thomas Bernard ...... 1892
Hayes, James Henry ................ 1892
Jenkins, Luther Lincoln ............ 1867
Jones, James Taber ................ 1875
Kelly, Edward Samuel .............. 1871
Leavitt, Miner La Harpe ............ 1890
Lewis, Ernest G .................... 1892
Lowd, John Colby .................. 1871
Markoe, George Frederick Holmes ... 1863
McColgan, Adam Thomas ........... 1892
*Metcalf, Theodore* ................. 1857
Mowry, Albert Daniel .............. 1884
O'Brien, James John ............... 1875
Patch, Edgar Leonard .............. 1872

*Patten, Ichabod Bartlett* ............ 1858
Pierce, William Herbert ............ 1879
Prescott, Horace Augustus .......... 1875
Sawyer, William Frederick .......... 1885
Scoville, Wilbur Lincoln ............ 1891
Sharples, Stephen Paschell .......... 1875
SHEPPARD, SAMUEL AIRUS DARLINGTON. 1865
Siegemund, Charles Augustus ........ 1882
Sleuman, Charles Andrew, Jr. ........ 1892
Smith, Linville Holton ............. 1892
Squires, George Brenton ............ 1891
Stowell, Daniel .................... 1875
Sumner, Alphonso ................. 1892
Thompson, James Henry ........... 1890
Tilden, A. K. .................... 1892
Tucker, Greenleaf Robinson ........ 1890
Vargas-Heredia, Jorge ............. 1891
Varney, Edward Francis ............ 1892
West, Charles Alfred ............... 1892
Wheeler, William Dexter ............ 1892
Williams, George Gorham ........... 1888
Wilson, Benjamin Osgood ........... 1859

*Brookfield.*

Hobbs, William ................... 1892

*Cambridge.*

Hubbard, John Henry .............. 1866
Wood, Edward Stickney ............ 1879

*Cambridgeport.*

BAYLEY, AUGUSTUS RAMSEY ......... 1859
La Pierre, Elie Henry ............... 1892
Laing, Alfred Allan ................ 1888
ORNE, JOEL STONE ................. 1859
Porter, Louis Fowler ............... 1892

*Charlestown.*

Marshall, Ernest Clifton ............ 1875
Stacey, Benjamin Franklin .......... 1860

*Chelsea.*

Buck, John ....................... 1855
Buck, John Lynian ................ 1883

*Concord.*

Richardson, Horatio Stillman ........ 1892

*Dover.*

*Colcord, Samuel Marshall* .......... 1852

*East Weymouth.*

Hoyt, George Melvin ............... 1875
*Turner, Thomas Larkin* ........... 1853

*Fall River.*

Riddell, Benjamin Franklin ......... 1892

*Fitchburg.*

Choate, John ...................... 1877
Estabrook, Henry Arthur ............ 1886

*Great Barrington.*

Whiting, Frederick Theodore ....... 1863

*Haydenville.*

Cone, Alfred George ............... 1892

*Hingham.*

Hardy, Cyrus D. .................. 1891

*Holyoke.*

Ball, Charles Ely .................. 1885
Fortier, Lawrence H. .............. 1892

*Lawrence.*

Glover, William Henry .............. 1891
Walker, Charles Wilkes ............. 1892
Whitney, Henry Martin ............. 1859

*Lee.*

Pease, Francis Merrick ............. 1880

*Lexington.*

Perham, Henry Albert .............. 1892

*Lowell.*

Bailey, Frederick .................. 1869
Butler, Freeman Hall ............... 1874
Hood, Charles Ira .................. 1871
*Kidder, Samuel* ................... 1859
Robinson, Edward Augustus ......... 1888
Thomasson, Anders ................ 1892

*Malden.*

Sargent, Jesse Warren .............. 1892

*Marlborough.*

Hartshorn, Frederick Arthur ........ 1880

*Methuen.*

Taylor, George Arthur .............. 1892

*Middleboro.*

Drake, Charles William ............ 1873

*New Bedford.*

Blake, James Edwin ................ 1866
Bunker, Elihu ..................... 1885
Hadley, Frank Rufus ............... 1872
Lawton, Charles Henry ............ 1873
Lawton, Horace Allen .............. 1873

Shurtleff, Israel Hammond..........1875
Taylor, John Pitman ................1875
Wright, Edward Ellsworth ..........1886

*Newburyport.*

*Goodwin, William W.*..............1853
Homer, John........................1887

*Newton.*

Hudson, Arthur ....................1882

*North Andover.*

*Berrian, George Washington.*.......1857

*Orange.*

Fish, Frederic Willis................1892

*Peabody.*

Grosvènor, Daniel Prescott .........1881

*Pittsfield.*

Burghardt, George Henry............1892
Fahey, Edward Francis..............1892
Farrell, Thomas Henry ..............1892
Hydren, Carl.......................1892
Manning, John Henry...............1889
Murphy, John Joseph...............1892

*Plymouth, Plymouth Co.*

Carver, Frank Hahnemann..........1891

*Provincetown.*

Adams, John Darrow................1892

*Quincy.*

Whall, Joseph Stokes ..............1873

*Rockland.*

Estes, Joseph Joslyn ...............1870

*Rockport.*

*Blatchford, Eben*...................1857

*Salem.*

Luscomb, William Edmund .........1881
Nichols, Thomas Boyden...........1876
Price, Charles Henry...............1882
Price, Joseph.......................1888

*Shelbourne Falls.*

Baker, Edwin .......................1875

*Somerville.*

Cowdin, George Henry.............1875
Flanagan, Lewis Cass ..............1875
Howland, Edgar Joseph ............1892

*South Framingham.*

Bridges, Charles Herbert ...........1892

*Stoneham.*

Ward, Charles Abraham ............1891

*Wellesley.*

Tailby, Joseph Allen ...............1892

*West Acton.*

Hutchins, Isaiah....................1880

*West Newton.*

Wright, Albert Francis .............1892

*Worcester.*

Bush, William......................1875
Hale, Chester S.....................1892
Scott, George Theodore ............1883
Williams, Duane Burnett ...........1881

## MICHIGAN.

*Ann Arbor.*

Brown, Henry Jefferson ............1882
Eberbach, Ottmar ..................1869
Mann, Albert .......................1889
Prescott, Albert Benjamin...........1871
Schlotterbeck, Julius Otto...........1888
Stevens, Alonzo Burdette ...........1885

*Armada, Macombe Co.*

Phillips, Edwin Freeman ...........1888

*Coopersville, Ottowa Co.*

Gillett, John .......................1892

*Detroit.*

Baier, Charles George ..............1887
Bassett, Arthur.....................1888
Bird, Harry L. .....................1891
Breningstall, Reuben Grant .........1891
Caldwell, James William............1875
Dupont, William ...................1887
Haynes, David Oliphant ............1887
Inglis, Frank.......................1887
Johnston, William, Jr ..............1888
Kennedy, Ezra Joseph..............1887
McFarland, Andrew.................1891
Mitchell, Edward Francis...........1891
Parker, Arthur Sheldon.............1891
Perry, Frederick William Riley ......1885
Raynale, Frank Bertrand............1891
Stearns, Henry Albyn ..............1888
Stevens, Fred. D...................1888

Stone, Clarence George .......... 1884
Thompson, Frank Augustus .......... 1888
*Vernor, James* .......... 1866
Warren, William Matthew .......... 1889

*East Saginaw.*

Prall, Delbert Elwyn .......... 1876

*Greenville.*

Hall, William Alanson .......... 1888

*Holly.*

Church, Howard Montague .......... 1887

*Ionia.*

Gundrum, George .......... 1882

*Kalamazoo.*

McDonald, George .......... 1871
Todd, Albert May .......... 1885

*Loomis, Isabella Co.*

Taylor, Celia Williams .......... 1888

*Manistee.*

Lyman, Asahel Hubert .......... 1884

*Muskegon.*

Brundage, Fred .......... 1888
Jesson, Jacob .......... 1872

*Owosso.*

Parkill, Stanley E. .......... 1887

*Red Jacket, Houghton Co.*

Macdonald, Daniel Turner .......... 1884

## MINNESOTA.

*Brainerd.*

Percy, William Gil .......... 1892

*Duluth.*

Boyce, Samuel F. .......... 1871
*Sweeny, Robert Ormsby* .......... 1866

*Fergus Falls.*

Harding, Lawrence Arthur .......... 1892

*Grove City.*

Gayner, John Niles .......... 1890

*Minneapolis.*

Allen, E. Floyd .......... 1885
Cook, Frank Lee .......... 1892
Crolius, Frank Marcelous .......... 1884
Huhn, George .......... 1884
Sanderson, Stephen Francis .......... 1880

*Rochester.*

Qvale, Victor Asbgörn .......... 1889

*St. Paul.*

Conger, Frederick Albert .......... 1887
Frost, William Arthur .......... 1892
Simmon, Karl .......... 1880
Warren, Edwin Alonzo .......... 1887
Wilkes, Arthur Perry .......... 1887

*Stillwater.*

Hening, James Courtenay .......... 1887

*Waseca.*

Rohde, Claus Frederick .......... 1885

## MISSISSIPPI.

*Aberdeen, Monroe Co.*

Eckford, Joseph William .......... 1883
Shell, James Lemmon .......... 1891

*Gloster, Amite Co.*

Schotel, John Charles .......... 1891

*Jackson.*

*Ash, Matthew Franklin* .......... 1856

*Meridian.*

Lillybeck, Oscar .......... 1891
Moore, Joshua Forest .......... 1891
White, William Henry .......... 1891

*Natchez.*

Means, John Coalter .......... 1891

*Port Gibson.*

Shreve, John Alexander .......... 1880

## MISSOURI.

*Appleton City.*

Anderson, Finis L. .......... 1892

*Boonsboro, Howard Co.*

Finn, Thomas .......... 1892

*Boonville.*

Mittelbach, William .......... 1891
Wooldridge, Daniel Turley .......... 1890

*Carrollton.*

Pettit, Henry McEwen .......... 1860

*Freeman.*

Dolan, Frank Linley .......... 1888

*Independence.*

Wight, Oscar Martin................1887

*Kansas City.*

Eyssell, George....................1889
Ford, William Thomas ..............1878
Gallagher, John Anthony ...........1881
Hess, Paul L.......................1892
Lahme, Charles Adolph..............1881
Willett, G. Howard ................1892

*Lebanon.*

Farrar, Samuel Richard.............1891

*Marceline, Linn Co.*

Shelton, William Armstrong ........1891

*Marshall.*

Franklin, Philip Henry.............1881

*Mexico, Audrain Co.*

Llewellyn, John Frederick ..........1867

*Moberly, Randolph Co.*

Last, Louis Christopher August......1888

*Pierce City, Lawrence Co.*

Armstrong, George Revington ......1877

*Pleasant Hill.*

Buckner, John Armstrong ..........1890

*Rich Hill.*

Youngs, William ...................1883

*Sedalia.*

Fleischmann, Augustus Theodore ....1885

*St. Joseph.*

Demond, Otto John..................1892

*St. Louis.*

Ahlbrandt, Henry Ernst ............1877
Alexander, Maurice William ........1871
Blank, Alois ......................1881
Boehm, Solomon ....................1871
Catlin, Ephron ....................1871
Curtman, Charles Otto .............1871
Frost, Louis Eugene ...............1891
Good, James Michener ..............1871
Grandjean, Charles ................1871
Grandjean, Eugene .................1871
Hassebrock, Henry Fred ............1884
Hemm, Francis .....................1881
Hoenny, Adolph John................1890
James, Frank Lowber ...............1888
Klie, George Henry Charles.........1878
Layton, Thomas.....................1892
*Leitch, Arthur* ..................1860
Mallinckrodt, Edward ..............1869
Meyer, Christian Fred. Gottlieb....1860
Morley, William Jarman.............1876
Pauley, Frank Charles..............1879
Physick, Henry Sandford ...........1870
SANDER, ENNO.......................1858
Scheffer, Henry William............1863
Schurk, Louis......................1890
Sennewald, Ferdinand William.......1865
Sippy, Alvin Hiram ................1890
Sohn, Frank .......................1888
Tomfohrde, Charles William ........1890
Tomfohrde, John William............1878
Uhlich, Ferdinand Gottlieb ........1881
Vogt, John Gerhard.................1890
Vordick, August Henry .............1874
Wall, Otto Augustus ...............1884
Westmann, Frank Henry .............1882
Whelpley, Henry Milton ............1887
Whitcomb, Frederick Ezekiel........1888
Wilson, Charles Frederick .........1891
Wurmb, Theodore Henry..............1890

*Weston.*

*Parr, John Conrad* ...............1856

## MONTANA.

*Anaconda.*

Brandon, Cole W....................1892

## NEBRASKA.

*Fairfield.*

Riggs, William Edward..............1892

*Lincoln.*

Daubach, Charles Joseph ...........1889
Kostka, Bruno Otto.................1889

*Norfolk.*

Koenigstein, Daniel John...........1892

*Omaha.*

Field, Amos .......................1871
Forsyth, James ....................1889
Goodman, Charles Frederick ........1871
Kuhn, Norman Archibald.............1878
Sherman, Charles Rollin............1889
Snow, Herbert Waldemar ............1887

## NEVADA.

*Gold Hill.*

Jones, John, Jr. .................... 1889

*Virginia City.*

Perkins, William Alexander ......... 1869

## NEW HAMPSHIRE.

*Claremont.*

Spofford, Charles Byron ............ 1884

*Derry Depot.*

Bell, Samuel Howard .............. 1890

*Dover.*

McFarland, George Francis ......... 1892
TUFTS, CHARLES AUGUSTUS ......... 1856

*Exeter.*

Wetherell, Albert Sumner........... 1892

*Great Falls.*

Hurd, John Charles................. 1892

*Greenville.*

Hall, Charles Edwin ............... 1884

*Hanover.*

Downing, Lucien Bliss.............. 1892

*Keene.*

Hodgkins, Bert Willis.............. 1888

*Lebanon.*

Wilder, George Patterson ........... 1892

*Littleton.*

Bowker, Everett Forrest ...... ..... 1892
Kenney, Herbert Eastman .......... 1890
Robins, Wilbur Fisk................ 1892

*Manchester.*

Baril, Joseph Benjamin ............. 1892
Currier, Edward Hervey............ 1892
Miville, Francis Charles ............ 1877
Smith, Amasa Daniel ............... 1889

*Nashua.*

Morse, Charles Milan .............. 1888
Whitman, Nelson Samuel .......... 1875

*New Market.*

*Dearborn, George Luther*........... 1853

*Portsmouth.*

Green, Benjamin.................... 1888
Preston, Andrew Peabody........... 1881

*Somersworth.*

Moore, George ..................... 1859

## NEW JERSEY.

*Asbury Park.*

Woolley, Stephen Disbrow........... 1888

*Bayonne.*

Alpers, William Charles............. 1890

*Bloomfield.*

Scherff, John Philip ................ 1877
Wood, George Mervin............... 1890

*Bordentown.*

Carslake, George Middleton......... 1880

*Bridgeton.*

Dare, Charles Ford.................. 1889
Davis, Theodore Garrison........... 1890

*East Orange.*

Davis, George Randolph............ 1883
Williams, Seward Whiting........... 1887

*Elizabeth.*

Brant, Edmund Wade............... 1882
Frohwein, Richard.................. 1867
Kent, Henry Avery, Jr.............. 1880
Oliver, William Murray............. 1875

*Englewood.*

Rockefeller, Lucius........... ..... 1880

*Freehold.*

Walker, Ansell...................... 1880
Walker, John Putnam............... 1881

*Hoboken.*

KLUSSMANN, HERMANN............. 1876

*Jersey City.*

*Abernethy, Maxwell*................ 1865
Beardmore, William Arthur ......... 1890
Brown, James...................... 1888
Dougherty, Samuel Edward ......... 1875
White, George Henderson........... 1868
Wienges, Conrad................... 1875

*Keyport.*

Warn, William Edgar............... 1886

*Matawan, Monmouth Co.*

Slater, Frank Hovey................ 1882

*Medford.*

Thorn, Henry Prickett..............1879

*Morristown.*

Carrell, Eugene Ayers..............1875

*Mt. Holly.*

WHITE, AARON SMITH..............1860

*Newark.*

Betzler, Jacob.....................1880
Bruguier, Francis..................1876
HOLZHAUER, CHARLES..............1873
Mennen, Gerhard..................1888
Sayre, William Henry..............1877
Smith, Charles Bradley.............1868
Smith, Clarence Pennington..........1890
Staebler, Richard Elimar Johannes ..1892
Stamford, William Harrison.........1876
Van Winkle, Abraham..............1871

*New Brunswick.*

Kilmer, Frederick Barnett...........1886
Rust, William.....................1870

*Newton.*

Ryerson, Henry Ogden..............1882

*Passaic.*

Groetsch, George William...........1892
Power, Frederick Belding...........1872

*Perth Amboy.*

Parisen, George Warren............1892

*Plainfield.*

Miller, Joseph Gilbert..............1886
*Ollif, James Henry*................1867
Reynolds, Howard Prescott..........1875
Shaw, Robert Johnston.............1875

*Rahway.*

Hatton, Edgar Melville............1878

*Roselle.*

Tiernan, Frank Mortimer............1880

*Somerville.*

Cook, Gilbert Snowden..............1886

*South Amboy.*

JACQUES, GEORGE WASHINGTON......1869

## NEW MEXICO.

*Deming, Grant Co.*

Kinnear, James Aloysius............1891

*Eddy, Eddy Co.*

Myhre, Olaus G....................1892

*Kingston.*

Nowers, Lawrence Edward..........1892

## NEW YORK.

*Albany.*

Gaus, Charles Henry...............1879
Gaus, Louis Henry.................1880
Gibson, Charles...................1880
Huested, Alfred Birch..............1879
McClure, William Henry............1880
Michaelis, Gustavus................1882
Sautter, Louis.....................1879
Turner, George Heather............1880
Walker, William John..............1880

*Auburn.*

Stanley, Edgar Clarke..............1880

*Binghamton.*

Loveland, Charles Hungerford.......1892
Otis, Clark Zelotes................1886

*Brooklyn.*

Aspinall, Walter Albert.............1880
Brooks, George Washington.........1879
Brundage, Albert Harrison..........1892
Colen, James Austin................1892
Curtiss, Charles Grenville...........1866
Cutts, Foxwell Curtiss, Jr............1875
Davis, William Mortimer............1879
Day, Carlos Erastus................1870
DeForest, William Pendleton........1879
Dennin, Charles....................1875
Dennin, Edwin Clinton.............1892
Douglass, Henry, Jr................1875
Dunn, John Augustus...............1867
Eccles, Mary Hance................1892
Eccles, Robert Gibson..............1885
FOUGERA, EDMOND CHARLES HENRY.1890
*Haviland, Henry*...................1857
Krieger, Philip.....................1876
Lehn, Louis.......................1874
Levy, Adolph......................1877
Livingston, Barent Van Buren.......1872
*Newman, George Anthony*..........1865
Owens, Richard John..............1860
Ray, Peter William.................1892
Reynolds, Charles Edward..........1882
*Snyder, Ambrose Chancellor*.........1867
Squibb, Edward Hamilton..........1882

Squibb, Edward Robinson .......... 1858
Stevens, Luther Fuller .............. 1879
Werner, Rudolf Carl ............... 1892
Zellhoefer, George ................ 1876

*Buffalo.*

Chase, Walter Herbert ............. 1892
Gregory, Willis George ............ 1886
Hayes, Horace Phillips ............ 1880
Mayer, John Frederick ............. 1892
*Peabody, William Huntington* ...... 1857
*Rano, Charles Orlando* ............ 1866

*Catskill.*

Du Bois, William Laneman ......... 1880

*Corning.*

Cole, Victor Le Roy ............... 1890

*Croton-on-Hudson.*

Henry, Charles (Dworniczak) ....... 1881

*Delhi.*

Ridgway, Lemuel Augustus ......... 1882

*Dunkirk.*

Davis, Eugene Miller .............. 1892

*Elmira.*

Holmes, Clay Wood ................ 1873

*Fairport.*

Rich, Willis Simmons ............. 1882

*Fishkill-on-Hudson.*

*Moith, Augustus Theodore* .......... 1860

*Flushing.*

Hepburn, John .................... 1873
James, William Tefft .............. 1882

*Geneseo, Livingston Co.*

Rogers, Arthur Henry .............. 1882

*Gloversville, Fulton Co.*

Miller, Jason Albert ............... 1879
Van Auken, Jerrie A. .............. 1880

*Haines Falls, Greene Co.*

McElhenie, Thomas Diamond ....... 1872

*Hannibal.*

Brewster, Wadsworth J. ............ 1880

*Holley, Orleans Co.*

Bishop, Francis Myron ............. 1882

*Jamaica, Queens Co*

Baylis, Lewis Fosdick .............. 1880
Goodale, Harvey Galusha ........... 1879
Peck, George Lyman ............... 1883

*Jamestown.*

Winnberg, John Magnus ............ 1892

*Kingston.*

Dedrick, William Frederick ......... 1884

*Middletown.*

KING, JAMES THEODORE ........... 1859
Rogers, William Henry ............. 1869

*Mount Vernon.*

Gill, George ...................... 1872

*Newburgh.*

Chapman, Isaac Close .............. 1887
Tartiss, Alfred Joseph .............. 1867

*New York City.*

Amend, Bernard Gottwald .......... 1892
Amend, Otto Paul ................. 1892
Atwood, Herman White ............ 1873
Balser, Gustavus .................. 1875
Bendiner, Samuel Julius ........... 1882
Billings, Henry Merry ............. 1869
Chandler, Charles Frederic .......... 1867
Coblentz, Virgil .................. 1882
Dick, Dundas ..................... 1879
Ditman, Andrew Jackson ........... 1868
Ebbitt, William Henry ............. 1889
Eimer, Charles .................... 1872
Elliott, Arthur Henry .............. 1892
Fairchild, Benjamin Thomas ........ 1875
Fairchild, Samuel William .......... 1887
Fink, Frederick William ........... 1886
Fisher, William ................... 1862
Ford, Herbert Lord ................ 1890
Foulke, James .................... 1881
Fraser, Horatio Nelson ............ 1888
Gardner, Robert Winslow .......... 1867
Geisler, Joseph Frank .............. 1889
GRIFFITH, ALBERT RICHARD ........ 1870
Haigh, De Lagnel ................. 1887
Hauenstein, William ............... 1883
Hays, Benjamin Franklin ........... 1886
Hays, David ...................... 1867
Hegeman, Johnson Niven .......... 1880
Heydenreich, Emile ................ 1867
Higgins, James Starkey ............ 1862

Hoffmann, Frederick ................1867
*Hudnut, Alexander*................1857
Hughes, Albert Ernest ..............1888
Hynard, Eugene Robert............ 1892
Ihlefeld, Conrad Heinrich.......... .1881
Jones, James Henry.................1892
Jungmann, Julius ....................1879
Kalish, Julius .......................1875
Kemp, Edward.......................1888
Knapp, Frank Fiero................1880
Koles, Samuel Morse................1890
Kraemer, Henry ....................1892
Lampa, Robert Raymond............1892
Leonhard, Rudolph Ernest...........1891
Lovis, Henry Christian..............1892
Maclagan, Henry....................1883
Macmahan, Thomas Jackson ........1871
Main, Thomas Francis...............1872
Major, Alphonse...... ..............1892
Martin, Robert Rowlett..............1892
Mason, Alfred Henry ...............1884
Massey, William Morton.............1885
McIntyre, Byron Floyd .............1876
McIntyre, Ewen.....................1873
McKesson, George Clinton...........1888
McKesson, John, Jr. ................1867
MILHAU, EDWARD LEON.............1858
*Molwitz, Ernest*...................1867
O'Neil, Henry Maurice..............1879
Osmun, Charles Alvin ...............1868
Pfingsten, Gustavus .................1873
Pleasants, Charles Henry ...........1890
Plummer, Edward ...................1889
Pyle, Cyrus ........................1859
Quackinbush, Benjamin Franklin.....1886
Ramsperger, Gustavus...............1860
Reichardt, Frederick Alfred.........1871
Rice, Charles.......................1870
Ricksecker, Theodore ...............1870
Rusby, Henry Hurd .................1890
Sayre, Edward Augustus .............1877
Schieffelin, William Jay..............1892
Schmidt, Ferdinand Traugott.. ......1886
Schmid, Henry......................1887
SEABURY, GEORGE JOHN ............1876
Shiels, George Emanuel .............1860
Skelly, James Joseph................1866
Smith, Reuben Randolph ............1890
Starr, Thomas.......................1870
Stoff, Louis Ferdinand...............1892
Tobin, John Martin..... .......... 1887
Tscheppe, Adolph ..................1876
Turner, Isaac Worthington..........1882
Vennard, William Lawrence.........1888
Weinman, Oscar Christian ..........1873
Wichelns, Frederick ................1881
Wickham, William Hull .............1870
Wilson, William....................1876

*Nyack, Rockland Co.*

De Graff, David ....................1879

*Olean.*

Coon, James Van Deventer..........1880

*Oswego.*

Butler, Charles Henry..............1887

*Plattsburgh.*

Hitchcock, John E. ................1892
Smith, John Clitherow..............1892

*Port Chester.*

Hyler, William Henry...............1875

*Port Henry.*

Smith, Edward Salvister ............1890

*Potsdam.*

Thatcher, Hervey Dexter ...........1865

*Richfield Springs.*

Smith, Willard Alfred ..............1880

*Rochester.*

Davis, Edward Hatch...............1880
Haass, George Herman.............1872
*Paine, James Dixon*...............1857
Schmitt, Joseph Max...............1882
Smith, Jay Hungerford..............1883

*Rome.*

Bissell, John Gordon ...............1875
Owens, James Alanson .............1882

*Saratoga Springs.*

Fish, Charles Frederick.............1866

*Syracuse.*

Dawson, Edward Seymour, Jr........1876
Snow, Charles Wesley..............1876

*Tonawanda, Erie Co.*

Scoville, Charles Henry ............1882

*Troy.*

Pennington, Thomas Henry Sands ...1877

*Utica.*

Blaikie, William....................1879
Cone, John Wright ..................1876
Maine, August ......................1892

*Wellsville, Allegheny Co.*

Hall, Edwin Bradford..............1879

*Yonkers.*

Eschman, Frederick William Rudolph.1880
Wray, George Brown.... .........1888

## NORTH CAROLINA.

*Asheville.*

Jacobs, Frederick Louria ...........1891
Smith, Whitefoord Gamewell........1892

*Charlotte.*

Wearn, William Henry..............1888

*Durham, Orange Co.*

Vaughan, Parry Wyche..............1882

*Fayetteville.*

Horne, Henry Ruffin.............. 1891
Sedberry, Bond English ............1882

*Kinston.*

Parrott, John Evans................1890

*Louisburg.*

Gooding, Robert Jacob..............1890

*Maxton.*

Croom, James Dallas................1890

*Oxford.*

Hancock, Franklin Wills.............1888

*Raleigh.*

Hunter, Buxton Williams............1891
Simpson, Robert ...................1891
Simpson, William...................1873

*Tarboro.*

Zoeller, Edward Victor..............1878

*Washington.*

*Gallagher, Charles Kewell*..........1857

*Wilmington.*

Hardin, John Haywood ............1881

## OHIO.

*Akron.*

Inman, Charles Trask ...............1885
Smith, Joseph Stahle ...............1878

*Atwater.*

Gurney, Charles Hazard .............1892

*Brooklyn Village.*

Schmidt, Carl ......................1891

*Bryan.*

Snyder, Alva Leach.................1873

*Caldwell.*

Bowron, Walter Henri...............1890

*Cheviot.*

Hildreth, Newton Gough ............1879

*Chillicothe.*

Howson, Arthur Bayshawe...........1886
Howson, Walter Henry..............1875
Nipgen, John Alvin .................1879

*Cincinnati.*

Bain, Andrew Watson...............1874
Betz, Otto Edward..................1887
De Lang, Alfred ....................1887
Eger, George .......................1864
Fennel, Charles Theodore Piderit ....1886
*Gordon, William John Maclester* ....1854
Greve, Theodore Lund August.......1864
Greyer, Julius .......................1880
Heineman, Otto.....................1864
Hoffman, Julius ....................1887
Klayer, Louis .......................1884
Koehnken, Herman Henry ..........1875
Lammert, Cyrus Joseph .............1881
Lloyd, John Uri.....................1870
Meininger, Albert ..................1881
Merrell, Charles George ............1888
Merrell, George ....................1879
Phillips, Charles Wilson ............1881
Ruppert, John ......................1880
Sauer, Louis Wendlin...............1882
Schreck, Leocadio Santos...........1881
Serodino, Herman...................1880
Simonson, William .................1887
Vilter, Hermann Theodore..........1881
Wagner, Henry .....................1876
Weeks, Benjamin Franklin..........1891
Wells, Jacob David .................1864
Wetterstroem, Albert Frederick Charles.1888
YORSTON, MATTHEW MACKAY .......1864
Zuenkeler, John Ferdinand..........1887

*Cleveland.*

Acker, Philip .......................1889

Asplin, John Harding ..............1882
Aubley, Samuel....................1888
Biddle, Herbert George ............1888
Bruce, James......................1882
Cobb, Ralph Lathrop ..............1883
Deutsch, Julius William ............1888
Dreher, Louis .....................1881
Erwin, James Jay .................1888
Feil, Joseph ......................1885
Fischer, Henry John ...............1888
Flood, William Henry .............1892
Gaylord, Henry Cleveland ..........1869
Gegelein, Frederick Leonhardt ......1881
Glines, George Walter..............1881
Hahn, Sigismund Joseph Frederick ..1887
Hechler, George Louis .............1882
Hopp, Lewis Christopher ...........1876
Kieffer, George....................1890
Kuhlmeier, Henry .................1888
Lehr, Philip .......................1885
May, Arthur Ferdinand.............1851
Myers, Daniel.....................1882
Rosewater, Nathan ................1880
Schellentrager, Ernst August ........1882
Schoenhut, Christian Henry ........1888
Scott, Frank Genio ................1891
Spenzer, Peter Ignatius.............1872
Urban, Jacob Philip................1881
Voss, George William ..............1885

*Columbiana.*

Ink, Charles Elliott ................1885

*Columbus.*

Bruck, Philip Henry ...............1884
Herbst, Frederick William ..........1882
Hoffman, Otto Louis...............1883
Huston, Charles ...................1872
Karb, George James ...............1883
Kauffman, George Beecher..........1882
Schueller, Ernst ...................1881
Schueller, Frederick William ........1880
Sherwood, Louis Walker............1882

*Conneaut.*

Simons, Arthur Henry..............1892

*Dayton.*

Burkhardt, Mark Anthony ..........1887
Kurfurst, Henry Ferdinand .........1881
Spengler, John George .............1887

*Glendale, Hamilton Co.*

Feemster, Joseph Hall..............1873
Sayre, Eugene Augustus ............1890

*Grand Rapids, Wood Co.*

Thurston, Azor....................1886

*Jefferson.*

Case, Charles Henry................1892

*Logan.*

Harrington, Frank..................1869

*Massillon, Stark Co.*

Baltzly, Zachariah Taylor ...........1876
Kirchhofer, Peter Paul..............1881

*Middletown.*

Johnson, Charles Brayton...........1876

*Navarre.*

Grossklaus, John Ferdinand.........1859

*Norwood, Hamilton Co.*

Weyer, John.......................1887

*Salem, Columbiana Co.*

Hawkins, Michael Smith............1870

*Scio.*

Beal, James Hartley................1892

*Springfield.*

Casper, Thomas Jefferson...........1867
Siegenthaler, Harvey N. ............1882

*Tiffin.*

Fleck, Jacob J. .....................1883

*Toledo.*

Hohly, Charles.....................1872

*Troy.*

Tobey, Charles William.............1879

*Wooster.*

Ohliger, Lewis Philip...............1871

OREGON.

*Portland.*

Blumauer, Louis...................1889
Clarke, Louis Gaylord .............1889
Dietrich, Howard Dickson ..........1889
Pfunder, William ..................1889
Sherwin, Eugene Alonzo............1889

*The Dalles.*

Blakeley, George Clarence ......... 1892

PENNSYLVANIA.

*Allegheny City.*

Armor, Alpheus .................... 1882
Eggers, Frederick Hermann.......... 1872
Slocum, Frank Leroy................ 1880

*Allentown.*

Klump, Charles Christian............ 1880

*Beaver, Beaver Co.*

Andriessen, Hugo................... 1875

*Bristol.*

Pursell, Howard.................... 1880
Young, John Kroesen ............... 1887

*Carlisle.*

Horn, Wilbur Fisk.................. 1876

*Chambersburg.*

Crawford, Walter Beatty, Jr. ........ 1891
Keefer, Charles DeWalt ............ 1891

*Connellsville.*

Berryhill, Henry Pennick ........... 1890

*Easton.*

Weaver, John Archibald ............ 1873

*Emporium, Cameron Co.*

Heilman, Russell Penrose .......... 1889

*Franklin.*

Riesenman, Joseph ................. 1883

*Harrisburg.*

George, Charles Theodore........... 1873
Gorgas, George Albert.............. 1884
Gross, Edward Ziegler.............. 1883
Miller, Jacob Augustus ............ 1873

*Lancaster.*

HEINITSH, CHARLES AUGUSTUS ...... 1857
Heinitsh, Sigmund William.......... 1889

*Lebanon.*

LEMBERGER, JOSEPH LYON.......... 1858
Redsecker, Jacob Henry............ 1881

*Lock Haven.*

Prieson, Adolph ................... 1880

*Media, Delaware Co.*

JONES, EDWARD CHARLES .......... 1864

*Minersville.*

Burns, John Kellar................ 1876

*Mt. Pleasant, Westmoreland Co.*

McElwee, Emer Judson............. 1888

*New Haven, Fayette Co.*

Hodgkins, Israel Marion............ 1887

*Norristown.*

Stahler, William.................. 1880

*Oil City.*

Krosskop, William Burton .......... 1887

*Orwigsburg, Schuylkill Co.*

Binkley, George K. ................ 1892

*Philadelphia.*

Bauer, Louis Gustavus.............. 1867
Blair, Henry Cowen................ 1868
Borell, Henry Augustus............. 1874
BORING, EDWIN MCCURDY.......... 1867
Bostick, Elmer Ellsworth ........... 1888
*Bower, Henry*.................... 1860
Bower, Henry Albert............... 1868
*Bullock, Charles*.................. 1857
Burg, John Dellinger............... 1888
Cook, Thomas Penrose ............. 1877
Dobbins, Edwards Tompkins........ 1867
Eberle, Charles Louis .............. 1865
Eddy, Henry Clay ................. 1869
*Ellis, Evan Tyson* ................ 1857
Finnerty, Edward John, Jr........... 1887
Fox, Peter Paul.................... 1869
French, Harry Banks ... .......... 1890
Früh, Carl Daniel Stephan.......... 1876
Gano, William Hubbell............. 1892
Gerhard, Samuel .................. 1873
*Grahame, Israel Janney* ........... 1856
Haenchen, Charles Eugene.......... 1865
Hance, Edward Hance.............. 1857
Hancock, Charles West ............ 1868
Hanson, Arthur Edward............ 1888
Hassinger, Samuel Ellphat Reed. .... 1880
Hayhurst, Susan................... 1890
*Heintzelman, Joseph Augustus*....... 1858
Hoskinson, John Thomas, Jr. ....... 1881
*Jenks, William Jenks*............. 1858
Jones, Alexander Henry ............ 1874
Jones, Daniel Sexton. .............. 1859
Keeney, Caleb Reynolds............ 1868
Kline, Mahlon Norwood............ 1878
Koch, Louis ...................... 1872

Krewson, William Egbert............1875
MAISCH, JOHN M. ..................1856
McIntyre, William..................1868
*Mellor, Alfred.* ....................1864
Miller, Adolph William..............1868
Milligan, Decatur...................1867
Moore, Joachim Bonaparte...........1860
Morris, Lemuel Iorwerth ............1880
Munson, James Harry...............1889
Murray, Bernard James..............1882
Newbold, Thomas Mitchell...........1876
Ogden, John........................1890
Ottinger, James Jeremiah ............1876
Peacock, Josiah Comegys ............1892
*Perot, Thomas Morris*...............1857
Pile, Gustavus......................1881
Poehner, Adolph Adam...............1889
Preston, David .....................1868
Procter, Wallace....................1874
REMINGTON, JOSEPH PRICE...........1867
Richter, Gustave Adolph ............1890
Riley, Charles William ..............1868
*Rittenhouse, Henry Norman* ........1857
Robbins, Alonzo....................1865
ROSENGARTEN, MITCHELL GEORGE...1869
Ryan, Frank Gibbs .................1892
Shinn, James Thornton..............1860
Shoemaker, Richard Martin..........1869
Stedem, Frederick Will. Edward .....1892
*Taylor, Alfred Bower* ..............1852
*Thompson, William Beatty* .........1858
Trimble, Henry ....................1876
*Warner, William Richard* ..........1857
Webb, William Henry...............1867
Weidemann, Charles Alexander......1868
Wendel, Henry Edward .............1873
*Wiegand, Thomas Snowdon*..........1857
ZEILIN, JOHN HENRY ...............1859

*Pittsburgh.*

Beach, Clifton Hilliard ..............1883
Emanuel Louis.....................1878
Finley, Ardon Chapman .............1890
Finley, Norval Howard..............1889
Hays, Joseph Anthony ..............1892
Henderson, Archibald Keys..........1888
Holland, Samuel Smith..............1876
Kelly, George Armstrong ............1882
Koch, Julius Arnold ................1892
Nisbet, William Washington ........1883

*Pittston.*

Rhoades, Stephen Howard...........1876

*Pottsville.*

Deibert, Thomas Irvin...............1882
Kennedy, George Washington.......1869

*Reading.*

*Fox, Daniel Soder* .................1872
Stein, Jacob Henry .................1869
Ziegler, Philip Milton ..............1867

*Schuylkill Haven.*

Commings, Charles Samuel..........1888

*Scottdale, Westmoreland Co.*

Cummings, Theodore Foster ........1882
McNeil, John Murray ...............1882

*Shamokin.*

Smink, William Henry R. ...........1885

*Towanda.*

Porter, Henry Carroll ...............1880

*Warren.*

Dixson, F. H.......................1892

*West Chester.*

Evans, Joseph Spragg ...............1877

*White Haven.*

Driggs, Charles M. .................1881

*Wilkes-Barre.*

Jones, Samuel Stephen ..............1887
Wolfe, Nathaniel ...................1878

*Williamsport.*

Cornell, Edward Augustus ..........1873
Duble, Jesse Balderston .............1870
Hill, Justin Luther..................1887

*York.*

Patton, John Franklin...............1880

## RHODE ISLAND.

*Newport.*

Cole, Charles Mowry ...............1888
Cotton, William Henry..............1885
Downing, Benjamin Franklin, Jr. ....1886

*Providence.*

Alfreds, Henry James ...............1883
Calder, Albert Layton...............1859
Cates, William Everett .............1888
Danforth, Edmund Culver ..........1878
Fenner, Alexander Wilson ..........1888

Greene, William Ray .............. 1883
O'Hare, James .................... 1888
Reynolds, William Keyes .......... 1876
Wood, Mason Bowen ................ 1882

*Westerly.*

Collins, Albert Burlingame ....... 1882

## SOUTH CAROLINA.

*Charleston.*

Aimar, Charles Pons .............. 1879
Burnham, Edward Steinmeyer ....... 1874
Eckel, Augustus William .......... 1874
Marsteller, George Ludwig ........ 1883

*Columbia.*

Thomas, Oscar Ernest ............. 1882

## SOUTH DAKOTA.

*Custer City.*

Taylor, Thomas Lachlin ........... 1892

*Howard.*

Ayer, Charles Foster ............. 1891

*Lake Preston.*

Keith, Irwin Alonzo .............. 1892

*Sioux Falls.*

Dunning, Lyman Taylor ............ 1891

## TENNESSEE.

*Athens.*

Carter, George Fleming ........... 1890

*Bristol.*

Bunting, Lindsay ................. 1890

*Chattanooga.*

Greve, Charles Mathias ........... 1887

*Knoxville.*

Gooding, Charles John ............ 1892
Yeager, Alvin Adams .............. 1888

*Memphis.*

ROBINSON, JAMES SCOTT ............ 1869

*Nashville.*

Burge, James Oscar ............... 1878
Gordon, Richard Haden ............ 1891
Wharton, John Criddle ............ 1872

*Tracy City.*

Patton, John Evander ............. 1890

*Tullahoma.*

Conger, Iliff .................... 1891

## TEXAS.

*Athens.*

La Rue, William Isaac ............ 1892

*Chillicothe, Hardeman Co.*

Keller, Frederick Philander Peter .... 1888

*Dallas.*

Connor, Lewis Myers .............. 1890
De Lorenzi, Albert ............... 1890
Fetterman, Thomas Moore .......... 1892
Keene, Thomas Rucker ............. 1888
Klauber, Charles Nathaniel ....... 1891
Schweickhardt, Richard ........... 1890

*Denison.*

Robert, William Henry, Jr. ....... 1892

*El Paso.*

Irvin, William Armstrong ......... 1879

*Ennis.*

Matkin, George Garrett ........... 1892

*Fort Worth.*

Powell, Thomas Wallace ........... 1874
Wells, Ebenezer Miller ........... 1878

*Galveston.*

Orton, Ingomar Francois .......... 1891
Preston, Calvin Walbridge ........ 1884

*Granbury.*

Morgan, Eugene Hilliard .......... 1892

*Houston.*

Burgheim, Jacob .................. 1892
Ross, Samuel Price ............... 1892

*Paris.*

Greiner, William Edward .......... 1892

*San Antonio.*

Chapa, Francisco A. .............. 1892
Cohn, Richard .................... 1892
Loelkes, Alexander George ........ 1891
Schmitt, George Joseph Francis ... 1890

*Seymour.*

Macmillan, Andrew Jackson ........1892

*Van Alstyne.*

Neathery, James M.................1892

## UTAH.

*Park City.*

Brother, William...................1892

*Salt Lake City.*

Druehl, Frank August..............1889
Farlow, John Boylan...............1889
Franken, James Latinnes...........1892

*Vernal.*

Butler, P. H.......................1892

## VERMONT.

*Brandon.*

Crossman, George Alvin ............1872

*Brattleboro.*

Chapin, Henry Allen...............1892

*Burlington.*

Van Patten, William James..........1892

*St. Albans.*

Dutcher, Alfred Luther.............1892

*St. Johnsbury.*

Bingham, Charles Calvin............1875

## VIRGINIA.

*Big Stone Gap.*

Shelton, William Camp.............1891

*Charlottesville.*

Harper, Harry Winston.............1881
Wills, Frederick Miles..............1890

*Danville.*

Cole, Howson White...............1882

*Falls Church.*

Church, Merton Elbridge ...........1892

*Fort Meyer.*

Roberts, William ..................1892

*Fredericksburg.*

Hall, Marshall Carter...............1870

*Gordonsville.*

Broadus, Thomas Madison ..........1890

*Leesburg.*

Purcell, Nicholas Sidney............1890

*Lynchburg.*

Craighill, Edward Addison..........1888

*Martinsville.*

Kearfott, Clarence Piercall ..........1890

*Norfolk.*

Jackson, Edward Calvert............1883
Masi, Walter Clements .............1890
Phillips, William Francis............1890

*Petersburg.*

Beckwith, Edmund Ruffin...........1886
Knock, Thomas Franklin ...........1882

*Richmond.*

Baker, Thomas Roberts.............1873
Briggs, Andrew Gessner ............1890
Scott, William Henry ..............1873

## WASHINGTON.

*La Conner, Skagit Co.*

Joergensen, Gerhard Johan Carl Sophus 1889

*Seattle.*

Holmes, Henry Elliott..............1880

## WEST VIRGINIA.

*Charleston, Kanawha Co.*

Boggs, Edwin Leslie ...............1872

*Wheeling.*

Bocking, Edmund..................1874
Gray, William Howlett .............1880
Williams, William Hudson..........1880

## WISCONSIN.

*Eau Claire.*

Blestren, Hans Markus Gunerius.....1889

*Fountain City.*

Bechman, Charles Richard ..........1882

*Janesville.*

Heimstreet, Edward Burton.........1874
Prentice, Fred. F. .................1876

*La Crosse.*

Beyschlag, Charles .................. 1880

*Madison.*

Bernhard, Charles Henry ........... 1888
Hollister, Albert Henry ............. 1884
Kremers, Edward .................. 1887

*Mayville, Dodge Co.*

Sauerhering, Rudolph Aurelius ....... 1884

*Milwaukee.*

Conrath, Adam .................... 1881
Dadd, John Alfred ................. 1880
Drake, John Ransom ............... 1860
Kienth, Hans ...................... 1884
Meissner, Paul Ernest .............. 1888
Ruenzel, Henry G. ................. 1892
Schrank, Charles Henry ............ 1876

*Neillsville.*

Sniteman, Charles Clarence .......... 1881

*West Superior.*

Godding, Edward Robert ........... 1884

*Wilson, St. Croix Co.*

Williams, Benjamin Christopher ...... 1890

WYOMING.

*Buffalo.*

Desmond, Edward .................. 1892

*Rawlins.*

Maghee, Thomas Gillison ............ 1892
Nicholson, William Sherman ........ 1890

## BERMUDA.

*Hamilton.*

*Heyl, James Bell* .................................................... 1863

## COSTA RICA.

*Cartago.*

Haussamen, Henry Louis .............................................. 1888

## DOMINION OF CANADA.

NOVA SCOTIA.

*Halifax.*

Simson, Francis Cook .............. 1876

*Kentville.*

Masters, Robert Silas .............. 1883

*Pictou.*

Fraser, Robert Peden ............... 1885

ONTARIO.

*Goderich.*

Jordan, Francis .................... 1877

*Hamilton.*

Clark, John Alexander .............. 1890

*Ottawa.*

Saunders, William ................. 1860

*St. Thomas.*

Foster, William Orrville ............ 1881

*Stratford.*

Waugh, George James .............. 1862

*Toronto.*

Lander, John Cambridge ............ 1877
Lowden, John ..................... 1875
Robinson, Ernest Frankish .......... 1889

*Windsor.*

D'Avignon, John Eugene ............ 1888

PRINCE EDWARD ISLAND.

*Charlottetown.*

Dodd, Simon Walker ............... 1884
Johnson, Arthur Sterling ............ 1889

QUEBEC.

*Montreal.*

Baridon, Louis Richard ............. 1890
Gray, Henry Robert ................ 1867
Lachance, Seraphin ................ 1888
Morland, Robert Lawson ............ 1892
Morrison, Joseph Edward ........... 1888

*Three Rivers.*

Williams, Richard Wellington ........ 1883

## HAWAIIAN ISLANDS.

*Honolulu.*

Lyons, Albert Byron........................................................1885

# MEMBERS RESIDING IN EUROPE.

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231 King st., Charleston, S. C.
Eckford, Joseph Wm.,
Commerce st., Aberdeen, Miss.
Eddy, Henry C.,
18th & Lombard sts., Philadelphia, Pa.
Edwards, Nathan W.,
Main st., Fairmount, Ind.
Edwards, William F.,
1800 East Baltimore st., Baltimore, Md.
Eger, George,
839 Central ave., Cincinnati, O.
Eggers, Frederick H.,
172 E. Ohio st., Allegheny City, Pa.
Ehrlicher, Henry M.,
334 Court st., Pekin, Ill.
Eichrodt, Charles W.,
503 North West st., Indianapolis, Ind.
Eimer, Charles,
130 E. 18th st, New York, N. Y.
Ekman, N. Adolf,
Oroville, Cal.
Elbe, Constantine B.,
Park st., Alameda, Cal.
Eliel, Leo,
101 Main st., South Bend, Ind.
Elliott, Arthur H.,
211 E. 23d st., New York, N. Y.
Elliott, Henry A.,
286 Lexington st., Baltimore, Md.
*Ellis, Evan T.*,
Philadelphia, Pa.
Emanuel, Louis,
2nd ave. & Grant st., Pittsburgh, Pa.
Emerson, Hermann L.,
Jacksonville, Fla.
Emich, Columbus V.,
423 N. Howard st., Baltimore, Md.
Enterkine, James E.,
2d & Main sts., Galena, Kan.
Ernst, Frank F.,
1152 Tremont st., Boston, Mass.
Erwin, James J.,
1617 Cedar ave., Cleveland, O.
Eschman, Clemens L.,
Phoenix, Maricopa county, Arizona.
Eschmann, F. W. R.,
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Estabrook, Henry A.,
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Estes, Joseph J.,
Union & Church sts., Rockland, Mass.
Evans, Joseph S.,
P. O. Box 657, West Chester, Pa.
Even, Charles,
201 N. Ramparts st., New Orleans, La.
Ewing, Frederic C.,
Grand ave. & 8th st., Glenwood Springs, Col.
Eyssell, George,
1036 Union ave., Kansas City, Mo.
Fahey, Edward F.,
173 North st., Pittsfield, Mass.
Fairchild, Benjamin T.,
84 Fulton st., New York, N. Y.
Fairchild, Samuel W.,
84 Fulton st., New York, N. Y.
Farlow, John B.,
Salt Lake City, Utah.
Farrar, Samuel R.,
Opera House Block, Lebanon, Mo.
Farrell, Thomas H.,
173 North st., Pittsfield, Mass.
Fay, Hamilton,
Pacific ave., Santa Cruz, Cal.
Fechter, Arthur E.,
62 Canalport ave., Chicago, Ill.
Feemster, Joseph H.,
Glendale, Hamilton co., O.
Feil, Joseph,
Cleveland, O.
Fennel, Charles T. P.,
8th & Vine sts., Cincinnati, O.
Fenner, Alexander W.,
351 Westminster st., Providence, R. I.
Fetterman, Thomas M.,
P. O. Box 398, Dallas, Texas.
Field, Amos,
Richardson Drug Co., Omaha, Neb.
Field, Claud,
318 E. St. Clair st., Indianapolis, Ind.
Fink, Frederick Wm.,
128 William st., New York, N. Y.
Finlay, Alexander K.,
186 Camp st., New Orleans, La.
Finley, Ardon C.,
Dairy ave., Pittsburgh, E. E., Pa.
Finley, Norval H.,
Dairy ave., Pittsburgh, E. E., Pa.
Finn, Thomas,
Fayette, Howard co., Mo.

Finnerty, Edward J., Jr.,
106 Market st., Philadelphia, Pa.
Fischer, Henry J.,
439 Pearl st., Cleveland, O.
Fischer, Oscar F.,
1558 Wabash ave., Chicago, Ill.
Fischer, Phil.,
848 W. Market st., Louisville, Ky.
Fish, Chas. F.,
348 Broadway, Saratoga Springs, N.Y.
Fish, Frederic W.,
Orange, Mass.
Fisher, Elbert E.,
144 Park ave., Bridgeport, Conn.
Fisher, William,
327 Bleecker st., New York, N. Y.
Flanagan, Lewis C.,
589 Somerville ave., Somerville, Mass.
Fleck, Jacob J.,
Washington & Perry sts., Tiffin, O.
Fleischer, Adolph T.,
296 N. Market st., Chicago, Ill.
Fleischmann, Augustus T.,
4th & Ohio sts., Sedalia, Mo.
Flint, Geo. B.,
1101 Broadway, Oakland, Cal.
Flint, John H.,
Marysville, Yuba co., Cal.
Flood, William H.,
1403 Woodland ave., Cleveland, O.
Ford, Charles M.,
700 15th st., Denver, Col.
Ford, Herbert L.,
96 Maiden Lane, New York, N. Y.
Ford, W. Thomas,
1305 Cherry st., Kansas City, Mo.
Forsyth, James,
126 S. 26th st., Omaha, Neb.
Forsyth, William K.,
3100 State st., Chicago, Ill.
Fortier, Lawrence H.,
372 High st., Holyoke, Mass.
Foster, William O.,
221 Talbot st., St. Thomas, Ontario, Can.
FOUGERA, EDMOND C. H.,
309 8th st., Brooklyn, N. Y.
Foulke, James,
91 Fulton st., New York, N. Y.
Fowler, Jos. W.,
200 W. Green st., Louisville, Ky.
*Fox, Daniel S.*,
Reading, Pa.
Fox, Peter P.,
Woodland ave. & 73rd st., Philadelphia, Pa.
Fraisse, Louis A.,
Main st., Houma, Terrebonne Parish, La.
Frames, J. Fuller,
601 N. Gay st., Baltimore, Md.
Francis, Walter R.,
170 Orange st., New Haven, Conn.
Franken, James L.,
Main & 3d South sts., Salt Lake City, Utah.
Franklin, Philip H.,
N. side Public Square, Marshall, Mo.
Fraser, Horatio N.,
208 5th ave., New York, N. Y.
Fraser, Robert P.,
Water st., Pictou, Nova Scotia.
Frauer, Herman E.,
246 E. Washington st., Indianapolis, Ind.
French, Harry B.,
429 Arch st., Philadelphia, Pa.
Frere, Alexander C.,
Main st., St. Mary's Parish, Franklin, La.
Frerksen, Richard G.,
North & California aves., Chicago, Ill.
Frohwein, Richard,
122 1st st., Elizabethport, N. J.
Frost, Louis E.,
700 Olive st., St. Louis, Mo.
Frost, William A.,
119 E. 3d st., St. Paul, Minn.
Früh, Carl D. S.,
2445 Ridge ave., Philadelphia, Pa.
Frye, George C.,
320 Congress st., Portland, Me.
FULLER, OLIVER F.,
220 Randolph st., Chicago, Ill.
*Gale, Edwin O.*,
85 S. Clark st., Chicago, Ill.
*Gale, William H.*,
85 S. Clark st., Chicago, Ill.
*Gallagher, Charles K.*,
2nd st., Washington, N. C.
Gallagher, John A.,
1107 Main st., Kansas City, Mo.
Galt, Edward P.,
924 Broad st., Selma, Ala.
Gammon, Irving P.,
150 Dudley st., Boston, Mass.
Gano, William H.,
1634 Columbia ave., Philadelphia, Pa.
Gardner, Robert W.,
158 William st., New York, N. Y.

Gates, Howard E.,
care of Wessells & Gates, Litchfield, Conn.
Gaus, Charles H.,
202 Washington ave., Albany, N. Y.
Gaus, Louis H.,
254 S. Pearl st., Albany, N. Y.
Gayle, John W.,
Ann & Market sts., Frankfort, Ky.
Gaylord, Henry C.,
110 Monument Square, Cleveland, O.
Gayner, John N.,
Grove City, Minn.
Gegelein, Frederick L.,
Payne & Case aves., Cleveland, O.
Geier, Oscar W.,
175 Main st., Carrollton, Ky.
Geisler, Joseph F.,
6 Harrison st., New York, N. Y.
George, Charles T.,
1306 N. 3d st., Harrisburg, Pa.
Gerhard, Samuel,
1400 Hanover st., Philadelphia, Pa.
Gessner, Emil A.,
301 Chapel st., New Haven, Conn.
Gibson, Charles,
74 State st., Albany, N. Y.
Gibson, James E.,
Main & Markham sts., Little Rock, Ark.
Gibson, John S.,
Hope, Hempsted co., Ark.
Gilbert, Charles A.,
150 Dudley st., Boston, Mass.
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Gillett, John,
Coopersville, Ottowa Co., Mich.
Gilpin, Henry B.,
Light & Lombard sts., Baltimore, Md.
Girling, Robert N.,
Washingt'n & Prytania sts., New Orleans, La.
Glines, George W.,
147 Franklin ave., Cleveland, O.
Glover, William H.,
591 Essex st., Lawrence, Mass.
Godbold, Fabius C.,
361 Magazine st., New Orleans, La.
Godding, Edward R.,
West Superior, Wis.
Godding, John G.,
278 Dartmouth st., Boston, Mass.
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Gooding, Robert J.,
Louisburg, N. C.
Goodman, Charles F.,
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Goodwill,
Goodwill Block, Minden, La.
Goodwin, Lester H.,
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*Goodwin, William W.*,
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*Gordon, William J. M.*,
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Gorgas, George A.,
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Gorman, John T. B.,
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Gosman, Adam J.,
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Grambois, Augustin,
131 Esplanade st., New Orleans, La.
Grandjean, Charles,
2828 N. 14th st., St. Louis, Mo.
Grandjean, Eugene,
2828 N. 14th st., St. Louis, Mo.
Grassly, Charles W.,
287 W. 12th st., Chicago, Ill.
Grauer, Albert,
449 St. Charles st., New Orleans, La.
Grauer, William,
468 Baronne st., New Orleans, La.
Gray, Henry R.,
122 St. Lawrence st., Montreal, Que., Can.
Gray, William,
843 Fulton st., Chicago, Ill.
Gray, William H.,
1 Odd Fellows' Hall, Wheeling, W. Va.
Green, Arthur L.,
Lafayette, Ind.
Green, Benjamin,
12 Market Square, Portsmouth, N. H.
Green, Hamer H.,
220 N. Centre st., Bloomington, Ill.

Green, Robert M.,
Myers st., Oroville, Butte co., Cal.
Greene, William R.,
1 Westminster st., Providence, R. I.
Gregory, Willis G.,
112 Niagara st., Buffalo, N. Y.
Greiner, William E.,
104 N. Side Sq., Paris, Tex.
Greve, Charles M.,
6th & Market sts., Chattanooga, Tenn.
Greve, Theodore L. A.,
John & 6th sts., Cincinnati, O.
Greyer, Julius,
Vine & Findlay sts., Cincinnati, O.
GRIFFITH, ALBERT R.,
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Grigsby, Robert L.,
168 Camp st., New Orleans, La.
Groetsch, George W.,
317 Passaic st, Passaic, N. J.
Gross, Edward Z.,
119 Market st., Harrisburg, Pa.
Grossklaus, John F.,
High st. and Public Square, Navarre, O.
Grosvenor, Daniel P., Jr.,
35 Main st., Peabody, Mass.
Gundrum, George,
Ionia, Mich.
Gurney, Charles H.,
Atwater, O.
Gutierrez, Antonio G.,
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Haass, G. Herman,
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Hadley, Frank R.,
64 N. 2d st., New Bedford, Mass.
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Haeusgen, H. Otto,
Anchorage, Ky.
Hahn, Sigismund J. F.,
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Haigh, De Lagnel,
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Haight, William B.,
care Lockwood & Haight, Stamford, Conn.
Hale, Chester S.,
974 Main st., Worcester, Mass.
Hall, Charles E.,
Main st., Greenville, N. H.
Hall, Charles K.,
77 Tchoupitoulas st., New Orleans, La.
Hall, Edwin B.,
173 Main st., Wellsville, Allegheny co., N.Y.
Hall, Marshall C.,
care of Hall Brothers, Fredericksburg, Va.
Hall, William A.,
Cass & Lafayette sts., Greenville, Mich.
Hallberg, Carl S. N.,
358 Dearborn st., Chicago, Ill.
Halleck, Wm. E.,
5th & H sts., N. W., Washington, D. C.
Hance, Edward H.,
Callowhill & Marshall sts., Philada., Pa.
Hancock, Charles W.,
3421 Spring Garden st., Philadelphia, Pa.
Hancock, Franklin W.,
Oxford, N. C.
Hancock, John F.,
4 South Howard st., Baltimore, Md.
Hancock, J. Henry,
800 W. Lombard st., Baltimore, Md.
Hanson, Arthur E.,
12 S. 34th st., Philadelphia, Pa.
Hardigg, William L.,
2d near Main st., Uniontown, Ky.
Hardin, John H.,
124 Front st., Wilmington, N. C.
Harding, Lawrence A.,
112 Lincoln ave., Fergus Falls, Minn.
Hardy, Cyrus D.,
Lafayette ave., Hingham, Mass.
Harlow, Noah S.,
4 Smith's Block, Bangor, Me.
Harper, Harry W.,
University of Virginia, Charlottesville, Va.
Harrington, Frank,
Main & Market sts., Logan, O.
Harris, Chester C.,
502 Franklin st., Tampa, Fla.
Harrison, Jacob H.,
305 Brady st., Davenport, Ia.
Hartshorn, Frederick A.,
15 Mechanics' st., Marlborough, Mass.
Hartwig, Charles F.,
476 Milwaukee ave., Chicago, Ill.
Hartwig, Otto J.,
1570 Milwaukee ave., Chicago, Ill.
Harvey, John M.,
407 Delaware ave., Wilmington, Del.
Hassebrock, Henry F.,
1901 Wright st., St. Louis, Mo.
Hassinger, Samuel E. R.,
Fairmount ave. & 23d st., Philadelphia, Pa.

Hassler, Alfred J.,
Haywards, Alameda co., Cal.
Hattenhauer, Robert C.,
163 Water st., Peru, Ill.
Hatton, Edgar M.,
Care of Dr. Hough, Rahway, N. J.
Hauenstein, William,
375 Amsterdam ave., New York, N. Y.
Haussamen, Henry L.,
Cartago, Costa Rica, Central America.
*Haviland, Henry*,
127 Park Place, Brooklyn, N. Y.
Hawkins, M. Smith,
84 Main st., Salem, Columbiana co., O.
Hay, Edward A.,
Middle & Free sts., Portland, Me.
*Hay, Henry H.*,
Free & Middle sts., Portland, Me.
Hayes, Horace P.,
312 Elk st., Buffalo, N. Y.
Hayes, James H.,
305 Sumner st., E. Boston, Mass.
Hayhurst, Susan,
Woman's Hospital, Philadelphia, Pa.
Haynes, David O.,
835 Jefferson ave., Detroit, Mich.
Hays, B. Frank,
543 Fifth ave., New York, N. Y.
Hays, David,
207 Division st., New York, N. Y.
Hays, Joseph A.,
147 S. 18th st., Pittsburgh, Pa.
Hechler, George L.,
1099 Broadway, Cleveland, O.
Hegeman, J. Niven,
770 Broadway, New York, N. Y.
Heilman, Russell P.,
Emporium, Cameron co., Pa.
Heimstreet, Edward B.,
Janesville, Wis.
Heinemann, Otto,
Laurel & Lynn sts., Cincinnati, O.
HEINITSH, CHARLES A.,
16 East King st., Lancaster, Pa.
Heinitsh, Sigmund W.,
120 S. Prince st., Lancaster, Pa.
*Heintzelman, Joseph A.*,
Ridge ave. & Master st., Philadelphia, Pa.
Helke, William L.,
2d & K sts., Sacramento, Cal.
Heller, George G.,
Missouri ave. & 5th st., East St. Louis, Ill.
Helmann, Otto,
206 Poydras st., New Orleans, La.
Hemm, Francis,
3907 S. Broadway, St. Louis, Mo.
Henderson, Archibald K.,
300 Frankstown ave., Pittsburgh, Pa.
Hening, James C.,
226 Chestnut st., Stillwater, Minn.
Henry, Charles (Dworniczak),
Croton-on-Hudson, N. Y.
Hepburn, John,
103 Main st., Flushing, N. Y.
Herbst, Frederick W.,
446 S. High st., Columbus, O.
Hermann, John G.,
Baltimore & Mechanic sts., Cumberland, Md.
Hervey, James,
704 Main st., Dubuque, Ia.
Hess, Paul L.,
9th st. & Woodland ave., Kansas City, Mo.
Heydenreich, Emile,
30 N. Williams st., New York, N. Y.
*Heyl, James B.*,
Vice-Consul, Hamilton, Bermuda.
Higby, William H.,
215 Main st., Streator, Ill.
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Hilby, Francis M.,
Monterey Pharmacy, Monterey, Cal.
Hildreth, Newton G.,
Cheviot, O.
Hill, Justin L.,
3d & Mulberry sts., Williamsport, Pa.
Hilton, Samuel L.,
1033 22d st., N. W., Washington, D. C.
Hiriart, Sebastian,
Bank & Plaquemine sts., Plaquemine, La.
Hitchcock, John E.,
39 Oak st., Plattsburgh, N. Y.
Hobbs, William,
Brookfield, Mass.
Hodges, J. Walter,
Penn. ave. & 2d st. S. E., Washington, D. C.
Hodgkins, Bert W.,
39 Central Square, Keene, N. H.
Hodgkins, Israel M.,
New Haven, Fayette co., Pa.
Hoenny, Adolph J.,
3631 N. Grand ave., St. Louis, Mo.
Hoffman, Julius,
429 Central ave., Cincinnati, O.

Hoffman, Otto L.,
4th & Town sts., Columbus, O.
Hoffmann, Frederick,
183 Broadway, New York, N. Y.
Hogan, John J.,
Anson & 6th sts., Birmingham, Conn.
Hogan, Louis C.,
6443 Yale st., Englewood, Chicago, Ill.
Hogey, Julius H.,
3038 Cottage Grove ave., Chicago, Ill.
Hohly, Charles,
602 S. St. Clair st., Toledo, O.
Holland, Samuel S.,
Smithfield & Liberty sts., Pittsburgh, Pa.
Hollister, Albert H.,
3 N. Pinckney st., Madison, Wis.
Holmes, Clay W.,
410 West Gray st., Elmira, N. Y.
Holmes, Henry E.,
Seattle, Wash.
HOLZHAUER, CHARLES,
787 Broad st., Newark, N. J.
Homer, John,
156 High st., Newburyport, Mass.
Hood, Charles I.,
Merrimac & Central sts., Lowell, Mass.
Hood, John W.,
Calhoun st., Haywards, Alameda co., Cal.
Hopp, Lewis C.,
198 Euclid ave., Cleveland, O.
Horn, Wilbur F.,
32 West Main st., Carlisle, Pa.
Horne, Henry R.
Hay st., Fayetteville, Cumberland co., N. C.
Hoskinson, J. Thomas, Jr.,
Front & Norris sts., Philadelphia, Pa.
Houghton, Harry J.,
Wentworth av.&66th,Englewood,Chicago,Ill
Howland, Edgar J.,
376 Somerville ave., Somerville, Mass.
Howson, Arthur B.,
Paint & Main sts., Chillicothe, O.
Howson, Walter H.,
Water & Walnut sts., Chillicothe, O.
Hoyt, George M.,
East Weymouth, Mass.
Hubbard, John H.,
468 Harvard st., Cambridge, Mass.
Hubert, Ernest,
335 Esplanade ave., New Orleans, La.
*Hudnut, Alexander,*
218 Broadway, New York, N. Y.
Hudson, Arthur,
Centre st., Newton, Mass.
Huecker, John,
15th & California sts., Denver, Col.
Huested, Alfred B.,
77 Eagle st., Albany, N. Y.
Hughes, Albert E.,
430 Hudson st., New York, N. Y.
Hughes, George,
1 W. Bay st., Jacksonville, Fla.
Hughes, James W.,
19th st. & 2d ave., Birmingham, Ala.
Huhn, George,
123 Nicollet st., Minneapolis, Minn.
Hunt, Denis D.,
301 5th st., San Francisco, Cal.
Hunt, Leonard W.,
2d & Cherry sts., Macon, Ga.
Hunter, Buxton W.,
Fayetteville st., Raleigh, N. C.
Huntington, William H.,
10 Federal st., New London, Conn.
Hurd, John C.,
26 Market st., Great Falls, N. H.
Hurty, John N.,
104 N. Penn st., Indianapolis, Ind.
Huston, Charles,
47 S. High st., Columbus, O.
Hutchins, Isaiah,
West Acton, Mass.
Hutton, Harry D.,
1033 22d st., N. W., Washington, D. C.
Hydren, Carl,
223 North st., Pittsfield, Mass.
Hyler, William H.,
Port Chester, N. Y.
Hynard, Eugene R.,
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Hynson, Henry P.,
421 N. Charles st., Baltimore, Md.
Ihlefeld, Conrad H.,
715 8th ave., New York, N. Y.
Illsley, George W. B.,
159 Clark st., Portland, Me.
Ingalls, Albert O.,
Murray, Shoshone co., Idaho.
Ingalls, John,
4th & Poplar sts., Macon, Ga.
Inglis, Frank,
177 Griswold st., Detroit, Mich.
Ink, Charles E.,
Columbiana, O.

Inman, Charles T.,
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Irvin, William A.,
El Paso, Texas.
Jackson, Edward C.,
523 Church st., Norfolk, Va.
Jacobs, Fred. L.,
Asheville, N. C.
JACQUES, GEORGE W.,
Broadway & Augusta st., S. Amboy, N. J.
James, Frank L.,
615 Locust st., St. Louis, Mo.
James, William T.,
20 Main st., Flushing, N. Y.
Jamieson, Thomas N.,
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4043 Market st., Philadelphia, Pa.
Jennings, N. Hynson,
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Jesson, Jacob,
Western ave & Jefferson st., Muskegon, Mich.
Joergensen, Sophus,
Commercial st., La Conner, Skagit co., Wash.
Johnson, Arthur S.,
Kent st., Charlottetown, P. E. I., Can.
Johnson, Charles B.,
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Johnson, Frank W.,
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Johnson, John,
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Johnston, Harry A.,
1001 O st., N. W., Washington, D. C.
Johnston, William, Jr.,
121 Jefferson ave., Detroit, Mich.
Jones, Alexander H.,
9th & Parrish sts., Philadelphia, Pa.
Jones, Daniel S.,
12th & Spruce sts., Philadelphia, Pa.
JONES, EDWARD C.,
33 E. 4th st., Media, Pa.
Jones, James H.,
3d ave. & 189th st., New York, N. Y.
Jones, James T.,
855 E. 4th st., Boston, Mass.
Jones, John, Jr.,
194 Main st., Gold Hill, Storey co., Nev.
Jones, Samuel S.,
54 Market st., Wilkes-Barre, Pa.
Jones, Simon N.,
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Jordan, Francis,
Court-house Square, Goderich, Ont., Can.
Joy, Edwin W.,
Mason & Post sts., San Francisco, Cal.
Judisch, George,
W. 5th & Walnut sts., Des Moines, Ia.
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Jungmann, Julius,
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179 W. 12th st., Chicago, Ill.
Kalish, Julius,
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Karb, Geo. J.,
4th & Main sts., Columbus, O.
Kauffman, George B.,
235 N. High st., Columbus, O.
Kearfott, Clarence P.,
Martinsville, Va.
Keefer, Chas. D.,
Main & Queen sts., Chambersburg, Pa.
Keene, Thomas R.,
Dallas, Tex.
Keeney, Caleb R.,
16th & Arch sts., Philadelphia, Pa.
Keil, Fred. C.,
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Keith, Irwin A.,
Lake Preston, S. Dak.
Keller, Fred. P. P.,
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Kelley, Edward S.,
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Kelly, George A.,
101 Wood st., Pittsburgh, Pa.
Kemp, Edward,
68 William st., New York, N. Y.
Kennedy, Ezra J.,
709 Woodward ave., Detroit, Mich.
Kennedy, George W.,
103 N. Centre st., Pottsville, Pa.
Kenney, Herbert E.,
Littleton, N. H.
Kent, Henry A., Jr.,
Park Drug Store, Elizabeth, N. J.
*Kent, Robert R.*,
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Keppler, Charles L.,
461 Dryades st., New Orleans, La.

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Kerr, William W.,
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Massillon, Stark co., O.
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Kline, Mahlon N.,
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Knapp, Frank F.,
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Knock, Thomas F.,
130 South ave., Petersburg, Va.
Knoebel, Thomas,
209 Collinsville ave., East St. Louis, Ill.
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19 W. Market st., New Albany, Ind.
Knudsen, Rudolph H.,
285 Noble st., Chicago, Ill.
Koch, Julius A.,
12th & Carson sts., Pittsburgh, Pa.
Koch, Louis,
329 N. 4th st., Philadelphia, Pa.
Kochan, John,
1463 Larimer st., Denver, Col.
Koehnken, Herman H.,
4th & Mill sts., Cincinnati, O.
Koenigstein, Daniel J.,
5th and Main sts., Norfolk, Neb.
Koles, Samuel M.,
214 Delancey st., New York, N. Y.
Kostitch, Stephen T.,
Box 1452, Denver, Col.
Kostka, Bruno O.,
1224 O st., Lincoln, Neb.
Kraemer, Henry,
209 E. 23d st., New York, N. Y.
Krehe, J. Theodor,
314 E. 2d st., Muscatine, Iowa.
Kremers, Edward,
435 Park st., Madison, Wis.
Krewson, William E.,
1836 Franklin st., Philadelphia, Pa.
Krieger, Philip,
Myrtle & Marcy sts., Brooklyn, N. Y.
Krosskop, William B.,
Oil City, Venango co., Pa.
Kuhlmeier, Henry,
523 Pearl st., Cleveland, O.
Kuhn, Norman A.,
124 S. 15th st., Omaha, Neb.
Kurfurst, Henry F.,
502 Xenia ave., Dayton, O.
La Pierre, Elie H.,
96 River st., Cambridgeport, Mass.
La Rue, William I.,
Athens, Texas.
Lachance, Seraphin,
1538 St. Catherine st., Montreal, Can.
Lahme, Charles A.,
428 Main st., Kansas City, Mo.
Laing, Alfred A.,
273 Pearl st., Cambridgeport, Mass.
Lalmant, Eugene,
Gasquet & Claiborne sts., New Orleans, La.
Lambert, John A.,
378 W. New York st., Indianapolis, Ind.
Lammert, C. Joseph,
Park ave., Walnut Hills, Cincinnati, O.

Lampa, Robert R.,
128 William st., New York, N. Y.
LAND, ROBERT H.,
812 Broad st., Augusta, Ga.
Lander, John C.,
Yorkville, Toronto, Can.
Last, Louis,
317 Reed st., Moberly, Mo.
Lauer, Michael J.,
Myrtle & Harlem aves., Baltimore, Md.
Lavigne, Jean B.,
261 N. Poydras st., New Orleans, La.
Lawton, Charles H.,
91 Union st., New Bedford, Mass.
Lawton, Horace A.,
91 Union st., New Bedford, Mass.
Layton, Thomas,
2743 N. Grand ave., St. Louis, Mo.
Leavitt, Miner L. H.,
65 Cambridge st., Boston, Mass.
Lee, Charles H.,
Main st., New Iberia, La.
LEE, JAMES A.,
Main st., New Iberia, La.
Leenheer, Bastian,
871 W. 22d st., Chicago, Ill.
Legendre, Joseph A.,
25 Dauphine st., New Orleans, La.
Lehman, John W.,
168 Camp st., New Orleans, La.
Lehn, Louis,
45 Strong Place, Brooklyn, N. Y.
Lehr, Philip,
1145 Lorain st., Cleveland, O.
Leis, George,
747 Massachusetts st., Lawrence, Kan.
Leist, Jacob L.,
100 E. Washington st., Indianapolis, Ind.
*Leitch, Arthur,*
2348 Olive st., St. Louis, Mo.
LEMBERGER, JOSEPH L.,
5 N. 9th st., Lebanon, Pa.
Leonardi, Sydney B.,
Franklin st., Tampa, Florida.
Leonhard, Rudolph E., (Vanderbilt Clinic),
10th ave. & 60th st., New York, N. Y.
Lernhart, August,
Centreville, Alameda co., Cal.
Levy, Adolph,
125 Grand st., E. D., Brooklyn, N. Y.
Lewis, Ernest G.,
701 Centre st., Jamaica Plain, Boston, Mass.
Libby, Henry F.,
Main st., Pittsfield, Me.
Lightstone, William H.,
Bay & Clay sts., Jacksonville, Fla.
Lilly, Eli,
Care of Eli Lilly & Co., Indianapolis, Ind.
Lilly, Josiah K.,
Indianapolis, Ind.
Lillybeck, Oscar,
5th st. & 23d ave., Meridian, Miss.
Livingston, Barent V. B.,
306 Broadway, Brooklyn, N. Y.
Llewellyn, John F.,
Public Square, Mexico, Audrain co., Mo.
Lloyd, John U.,
Court & Plum sts., Cincinnati, O.
Lockhart, George B.,
32d & O sts., West Washington, D. C.
Loehr, Theodore C.,
Carlinville, Macoupin co., Ill.
Loelkes, Alexander G.,
507 W. Commerce st., San Antonio, Tex.
Long, John C.,
1700 Stout st., Denver, Col.
Loomis, John C.,
Chestnut & Watt sts., Jeffersonville, Ind.
Lord, Frank J.,
1101 Larimer st., Denver, Col.
Lord, Thomas,
72 Wabash ave., Chicago, Ill.
Loveland, Charles H.,
392 Chenango st., Binghamton, N. Y.
Lovis, Henry C.,
238 W. 131st st., New York, N. Y.
Lowd, John C.,
43 Temple Place, Boston, Mass.
Lowden, John,
53 Colborne st., Toronto, Can.
Luscomb, William E.,
289 Essex st., Salem, Mass.
Lyman, Asahel H.,
427 W. River st., Manistee, Mich.
Lyons, Albert B.,
Honolulu, Sandwich Islands.
Lyons, Isaac L.,
42 Camp st., New Orleans, La.
Macdonald, Daniel T.,
Red Jacket, Houghton co., Mich.
Maclagan, Henry,
91 Fulton st., New York, N. Y.
Maclise, James,
San Pablo ave. & 17th st., Oakland, Cal.

Macmahan, Thomas J.,
142 6th ave., New York, N. Y.
Macmillan, Andrew J.,
Main & Morris sts., Seymour, Tex.
Macy, Sherman R.,
Highl'd Park NormalCollege,DesMoines,Ia.
Maghee, Thomas G.,
5th & Cedar sts., Rawlins, Wyo.
Main, Thomas F.,
278 Greenwich st., New York, N. Y.
Maine, August,
352 Whitesboro st., Utica, N. Y.
Maisch, Henry C. C.,
301 W. Broadway, Louisville, Ky.
MAISCH, JOHN M.,
753 N. 40th st., Philadelphia, Pa.
Majer, Oscar,
400 S. 2d st., Clinton, Ia.
Major, Alphonse,
232 William st., New York, N. Y.
Major, John R.,
800 7th st., Washington, D. C.
Mallinckrodt, Edward,
Mallinckrodt & Main sts., St. Louis, Mo.
Mann, Albert,
39 S. Main st., Ann Arbor, Mich.
Manning, John H.,
51 North st., Pittsfield, Mass.
Markoe, George F. H.,
27 Central st., Boston, Mass.
Marshall, Ernest C.,
157 Bunker Hill st., Boston, Mass.
Marsteller, George L.,
231 King st., Charleston, S. C.
Martin, Hugo W. C.,
358 State st., Chicago, Ill.
Martin, John C.,
U. S. Nav. Dispensary, Washington, D. C.
Martin, Nicholas H.,
Northumb'dRd.,Newcastle-upon-Tyne,Eng.
Martin, Robert R.,
41 John st., New York, N. Y.
Masi, Walter C.,
208 Main st., Norfolk, Va.
Mason, Alfred H.,
59 Maiden Lane, New York, N. Y.
Massey, William M.,
1129 Broadway, New York, N. Y.
Masters, Robert S.,
Main st., Kentville, Nova Scotia.
Matkin, George G.,
Care of J. M. Pelters, Ennis, Tex.
Mattingly, George J.,
1164 Magazine st., New Orleans, La.
May, Arthur F.,
227 Garden st., Cleveland, O.
May, Eugene,
Canal & Chartres sts., New Orleans, La.
May, James O.,
Water st., Naugatuck, Conn.
Mayer, John F.,
252 Forest ave., Buffalo, N. Y.
McAfee, John J.,
252 Beauregard st., Mobile, Ala.
McCartney, Winfield S.,
Selma, Fresno co., Cal.
McClure, William H.,
74 State st., Albany, N. Y.
McColgan, Adam T.,
507 Tremont st., Boston, Mass.
McComas, Percy G.,
1801 Vermont ave., Washington, D. C.
*McConville, Thomas A.*,
Macon, Ga.
McDonald, George,
Main & Burdick sts., Kalamazoo, Mich.
McElhenie, Thomas D.,
Haines Falls, Green co., N. Y.
McElwee, Emer J.,
517 Main st., Mount Pleasant, Pa.
McFarland, Andrew,
693 Michigan ave., Detroit, Mich.
McFarland, George F.,
203 Central ave., Dover, N. H.
McIntyre, Byron F.,
care of Reed & Carnrick, New York, N. Y.
McIntyre, Ewen,
39 W. 18th st., New York, N. Y.
McIntyre, William,
2429 Frankford ave., Philadelphia, Pa.
McKesson, G. Clinton,
91 Fulton st., New York, N. Y.
McKesson, John, Jr.,
91 Fulton st., New York, N. Y.
McNeil, John M.,
Broadway, Scottdale, Westmoreland co., Pa.
*McPherson, George*,
Residence unknown.
Means, John C.,
123 N. Commerce st., Natchez, Miss.
Mehl, Henry W.,
5th & Delaware sts., Leavenworth, Kan.
Meininger, Albert,
Vine & 12th sts., Cincinnati, O.

Meissner, F. W., Jr.,
820 Main st., La Porte, Ind.
Meissner, Paul E.,
519 Astor st., Milwaukee, Wis.
*Mellor, Alfred,*
218 N. 22d st., Philadelphia, Pa.
Melvin, Samuel H.,
6th ave. & 14th st., East Oakland, Cal.
Mendoza, Francis F.,
Whitehead & Eaton sts., Key West, Fla.
Mennen, Gerhard,
577 Broad st., Newark, N. J.
Merrell, Ashbel H.,
6th ave. & Clay st., Topeka, Kan.
Merrell, Charles G.,
6th st. & Eggleston ave., Cincinnati, O.
Merrell, George,
6th st. & Eggleston ave., Cincinnati, O.
*Metcalf, Theodore,*
39 Tremont st., Boston, Mass.
Metz, Abraham L.,
Prytania st., New Orleans, La.
Meyer, Christian F. G.,
4th st. and Clark ave., St. Louis, Mo.
Michaelis, Gustavus,
1 Myrtle ave., Albany, N. Y.
MILBURN, JOHN A.,
1817 16th st., N. W., Washington, D. C.
MILHAU, EDWARD L.,
183 Broadway, New York, N.Y.
Miller, Adolph W.,
3d & Callowhill sts., Philadelphia, Pa.
Miller, Charles G.,
P. O. Box 242, Birmingham, Ala.
Miller, Jacob A.,
2d & Chestnut sts., Harrisburg, Pa.
Miller, James M.,
Main st., Vacaville, Solano co., Cal.
Miller, Jason A.,
7 N. Main st., Gloversville, N. Y.
Miller, Joseph G.,
10 E. Front st., Plainfield, N. J.
Milligan, Decatur,
509 N. 2d st., Philadelphia, Pa.
Miner, Maurice A.,
40 Dearborn st., Chicago, Ill.
Miner, Mrs. Mary O.,
Hiawatha, Brown co., Kan.
Mitchell, Edward T.,
Parke, Davis & Co., Detroit, Mich.
Mittelbach, William,
114 Main st., Boonville, Mo.
Miville, Francis C.,
1023 Elm st., Manchester, N. H.
*Moffitt, Thomas S.,*
2119 Webster st., San Francisco, Cal.
Mohr, Charles,
931 Dauphin st., Mobile, Ala.
*Moith, Augustus T.,*
1 Ferry st., Fishkill, N. Y.
*Molwitz, Ernest,*
2707 8th ave., New York, N. Y.
Moody, Richard H.,
Main & High sts., Belfast, Me.
Moore, Charles G.,
Eufaula, Indian Territory.
Moore, George,
26 Market st., Somersworth, N. H.
Moore, Joachim B.,
13th & Lombard sts., Philadelphia, Pa.
Moore, John T.,
1012 Rhode Island st., Lawrence, Kan.
Moore, Josh. F.,
4th st., Meridian, Miss.
Moore, Silas H.,
80 4th st., Sioux City, Ia.
More, Arthur J.,
304 Pearl st., Sioux City, Ia.
Morgan, Aylmer L.,
Washington & Adam sts., Camden, Ark.
Morgan, Eugene H.,
Granbury, Tex.
Morland, Robert L.,
4313 St. Lawrence ave., Chicago, Ill.
Morley, William J.,
109 S. 2d st., St. Louis, Mo.
Morris, Lemuel I.,
720 N. Broad st., Philadelphia, Pa.
Morris, William G.,
833 W. Lake st., Chicago, Ill.
Morrison, Joseph E.,
33 Church st., Montreal, Quebec, Can.
Morse, C. Milan,
95 Main st., Nashua, N. H.
Moulton, Daniel P.,
213 Lisbon st., Lewiston, Me.
Mowry, Albert D.,
365 Warren st., Boston, Mass.
Mueller, Adolph,
Cherry st., Highland, Ill.
Mueller, Otto E.,
801 E. Madison st., Louisville, Ky.
Munson, James H.,
24th & Lombard sts., Philadelphia, Pa.

Munson, Luzerne I.,
Apothecaries' Hall, Waterbury, Conn.
Murphy, John J.,
Pittsfield, Mass.
Murray, Bernard J.,
3286 Ridge ave., Philadelphia, Pa.
Myers, Daniel,
111 Water st., Cleveland, O.
Myhre, Olaus G.,
Fox st., Eddy, Eddy co., N. Mex.
Nattans, Arthur,
2d & D sts., N. W., Washington, D. C.
Neathery, James M.,
North side Jefferson st., Van Alstyne, Tex.
Neppach, Stephen A.,
Fruit Vale, Alameda co., Cal.
Newbold, Thomas M.,
608 S. 42d st., Philadelphia, Pa.
Newman, George A.,
5th & Walnut sts., Louisville, Ky.
*Newman, George A.*,
380 Myrtle ave., Brooklyn, N. Y.
Newton, Philo W.,
142 Asylum st., Hartford, Conn.
Nichols, John C.,
55 State st., New London, Conn.
Nichols, Thomas B.,
178 Essex st., Salem, Mass.
Nicholson, William S.,
Rawlins, Wyo.
Nipgen, John A.,
Paint & 2d sts., Chillicothe, O.
Nisbet, William W.,
Washington ave., Pittsburgh, Pa.
Noll, Matthias,
627 Commercial st., Atchison, Kan.
Norton, Edward B.,
2d ave. & 20th st., Birmingham, Ala.
Nowers, Lawrence E.,
Kingston, N. Mex.
O'Brien, James J.,
53 Kneeland st, Boston, Mass.
O'Hare, James,
6 Benefit st., Providence, R. I.
O'Neil, Henry M.,
463 Hudson st., New York, N. Y.
Oberdeener, Samuel,
Franklin st., Santa Clara, Cal.
Ogden, John,
1233 Walnut st., Philadelphia, Pa.
Oglesby, Geo. D.,
Lake ave. & 50th st., Chicago, Ill.
Ohliger, Lewis P.,
23 West Liberty st., Wooster, O.
Oldberg, Oscar,
40 Dearborn st., Chicago, Ill.
Oleson, Olaf M.,
Fort Dodge, Iowa.
Oliver, William M.,
132 Broad st., Elizabeth, N. J.
*Ollif, James H.*,
200 Arlington ave., Plainfield, N. J.
ORNE, JOEL S.,
493 Main st., Cambridgeport, Mass.
Orton, Ingomar F.,
13th st., Galveston, Tex.
Osgood, Hugh H.,
148 Main st., Norwich, Conn.
Osmun, Charles A.,
13 7th ave., New York, N. Y.
Otis, Clark Z.,
63 Court st., Binghamton, N. Y.
Ottinger, James J.,
20th & Spruce sts., Philadelphia, Pa.
Otto, John N. W.,
76 S. Rampart st., New Orleans, La.
Owens, James A.,
45 Dominick st., Rome, N. Y.
Owens, Richard J.,
Myrtle ave. & Spencer st., Brooklyn, N. Y.
*Paine, James D.*,
P. O. Box 64, Rochester, N. Y.
Parcher, George A.,
Main st., Ellsworth, Me.
Parisen, George W.,
Smith & High sts., Perth Amboy, N. J.
Parker, Arthur S.,
747 Woodward ave., Detroit, Mich.
Parker, George H.,
Draper's Block, Main st., Andover, Mass.
Parkill, Stanley E.,
Owosso, Shiawassee co., Mich.
*Parr, John C.*,
Main st., Weston, Mo.
Parrott, John E.,
Kinston, Lenoir co., N. C.
Parsons, John,
194 31st st., Chicago, Ill.
Partridge, Charles K.,
Granite Block, Augusta, Me.
Patch, Edgar L.,
109 Green st., Boston, Mass.
*Patten, I. Bartlett*,
Washington st., Boston, Mass.

Patterson, Theodore H.,
3640 Cottage Grove ave., Chicago, Ill.
Pattison, Charles H.,
Grand Crossing, Ill.
Patton, John E.,
Tracy City, Grundy co., Tenn.
Patton, John F.,
237 W. Market st., York, Pa.
Patton, Joseph,
Tipton, Ia.
Pauley, Frank C.,
Eastern st. & Compton ave., St. Louis, Mo.
*Peabody, William H.*,
8 S. Division st., Buffalo, N. Y.
Peacock, Josiah C.,
3909 N. 5th st., Philadelphia, Pa.
Pease, Francis M.,
Main st., Lee, Mass.
Peck, George L.,
Hall of Pharmacy, Jamaica, N. Y.
Pennington, T. H. Sands,
Troy, N. Y.
Percy, William G.,
Brainerd, Minn.
Perham, Henry A.,
Main st., Lexington, Mass.
Perkins, Benjamin A.,
16 Pine st., Portland, Me.
Perkins, Charles W.,
297 Main st., New Britain, Conn.
*Perkins, Elisha H.*,
Green & Baltimore sts., Baltimore, Md.
Perkins, William A.,
84 S. C st., Virginia City, Nev.
*Perot, T. Morris*,
1810 Pine st., Philadelphia, Pa.
Perry, Frederick W. R.,
709 Woodward ave., Detroit, Mich.
Petsche, Bismarck W.,
1244 E. Broadway, Louisville, Ky.
Pettit, Henry M.,
Carrollton, Mo.
Peyton, Robert D.,
1317 4th ave., Louisville, Ky.
Pfafflin, Henry A.,
402 S. Delaware st., Indianapolis, Ind.
Pfingst, Edward C.,
3d & Breckenridge sts., Louisville, Ky.
PFINGST, FERDINAND J.,
18th & Main sts., Louisville, Ky.
Pfingsten, Gustav,
6 Whitehall st., New York, N. Y.
Pfunder, William,
1st & Ash sts., Portland Oregon.
Phelps, Dwight,
337 Main st., West Winsted, Conn.
Phillips, Charles W.,
484 Eastern ave., Cincinnati, O.
Phillips, Edwin F.,
4 E. Main st., Armada, Mich.
Phillips, William F.,
216 Main st., Norfolk, Va.
Physick, Henry S.,
3104 Easton ave., St. Louis, Mo.
Pickett, John H.,
Oskaloosa, Mahaska co., Iowa.
Pieck, Edward L.,
6th & Main sts., Covington, Ky,
Pierce, William H.,
316 Shawmut ave., Boston, Mass.
Pile, Gustavus,
770 Passyunk ave., Philadelphia, Pa.
Pitt, John R., Jr.,
218 Main st., Middletown, Conn.
Pleasants, Charles H.,
61 W. Houston st., New York, N. Y.
Plummer, David G.,
6 Main st., Bradford, Stark county, Ill.
Plummer, Edward,
1300 Broadway, New York, N. Y.
Plummer, Joseph W.,
504 Simonton st., Key West, Fla.
Poehner, Adolph A.,
1234 Columbia ave., Philadelphia, Pa.
Porter, Chilton S.,
Somerset, Pulaski co., Ky.
Porter, Henry C.,
Main & Pine sts., Towanda, Pa.
Porter, Louis F.,
151 Winsor st., Cambridgeport, Mass.
Porter, Martin L.,
Danforth, Me.
Porter, Millett N.,
3850 State st., Chicago, Ill.
Powell, Robert B.,
2d & G sts., Eureka, Humboldt Bay, Cal.
Powell, Thomas W.,
10 Houston st., Fort Worth, Tex.
Power, Frederick B.,
225 Gregory ave., Passaic, N. J.
Prall, Delbert E.,
111 S. Jefferson st., East Saginaw, Mich.
Prentice, Fred F.,
Opposite Post Office, Janesville, Wis.

Prescott, Albert B.,
University of Michigan, Ann Arbor, Mich.
Prescott, Horace A.,
360 Washington st., Boston, Mass.
Preston, Andrew P.,
2 Congress Block, Portsmouth, N. H.
Preston, Calvin W.,
22d & Market sts., Galveston, Tex.
Preston, David,
9th & Lombard sts., Philadelphia, Pa.
Price, Charles A.,
Welton & Pierpont sts., Denver, Col.
Price, Charles H.,
226 Essex st., Salem, Mass.
Price, Joseph,
226 Essex st., Salem, Mass.
Prieson, Adolph,
Main & Vesper sts., Lock Haven, Pa.
Procter, Wallace,
1900 Pine st., Philadelphia, Pa.
Puckner, William A.,
465 State st., Chicago, Ill.
Punch, William F.,
71 Dauphin st., Mobile, Ala.
Purcell, Nicholas S.,
King st., Leesburgh, Va.
Pursell, Howard,
Mill & Cedar sts., Bristol, Pa.
Pyle, Cyrus,
88 Warren st., New York, N. Y.
Quackinbush, Benjamin F.,
703 Greenwich st., New York, N. Y.
Qvale, Victor A.,
Rochester, Minn.
Rademaker, Herman H.,
801 E. Madison st., Louisville, Ky.
Ramsperger, Gustavus,
236 E. 23d st., New York, N. Y.
Rand, Daniel M.,
Main & Depot sts., S. Windham, Me.
*Rano, Charles O.*,
1872 Niagara st., Buffalo, N. Y.
Rapelye, Charles A.,
325 Main st., Hartford, Conn.
Ray, Frederick E.,
901 K st., Sacramento, Cal.
Ray, Peter W.,
379 S. 2nd st., Brooklyn, N. Y.
Raymond, Harry L.,
833 Massachusetts st., Lawrence, Kan.
Raynale, Frank B.,
32 Woodward ave., Detroit, Mich.

Redsecker, Jacob H.,
810 Cumberland st., Lebanon, Pa.
Reed, Charles C.,
111 Kickosoo st., Lincoln, Ill.
Reichardt, F. Alfred,
45 Maiden Lane, New York, N. Y.
REMINGTON, JOSEPH P.,
1832 Pine st., Philadelphia, Pa.
Renz, Frederick J.,
Market & Floyd sts., Louisville, Ky.
Reynolds, Charles E.,
U. S. Rec'g Ship Vermont, Brooklyn, N. Y.
Reynolds, Howard P.,
Park & North aves., Plainfield, N. J.
Reynolds, John J.,
Water & Main Cross sts., Flemingsburg, Ky.
Reynolds, William K.,
354 Friendship st., Providence, R. I.
Rhoades, Stephen H.,
23 N. Main st., Pittston, Pa.
Rhode, Rudolph E.,
504 N. Clark st., Chicago, Ill.
Rice, Charles,
Bellevue Hospital, New York, N. Y.
Rich, Willis S.,
Fairport, Monroe co., N. Y.
Richardson, Horatio S.,
Main st., Concord, N. H.
Richter, Gustave A.,
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Ricksecker, Theodore,
146 William st., New York, N. Y.
Riddell, Benjamin F.,
8 Granite Block, Fall River, Mass.
Ridgway, Lemuel A.,
Delhi, N. Y.
Riesenman, Joseph,
1266 Liberty st., Franklin, Pa.
Riggs, William E.,
Fairfield, Clay co., Neb.
Riley, Charles W.,
1343 N. 13th st., Philadelphia, Pa.
*Rittenhouse, Henry N.*,
1705 N. 17th st., Philadelphia, Pa.
Rives, Edward B.,
56 N. Main st., Los Angeles, Cal.
Robbins, Alonzo,
11th & Vine sts., Philadelphia, Pa.
Robert, William H., Jr.,
431 W. Main st., Denison, Tex.
Roberts, Daniel J.,
Peabody, Marion co., Kan.

Roberts, William,
Fort Meyer, Va., P. O. Washington, D. C.
Robertson, Felix O.,
Searcy, White co., Ark.
Robin, Oscar,
249 St. Ann st., New Orleans, La.
Robins, Wilbur F.,
28 Main st., Littleton, N. H.
Robinson, Edward A.,
19 Warwick st., Lowell, Mass.
Robinson, Ernest F.,
832 Yonge st., Toronto, Ont., Can.
ROBINSON, JAMES S.,
2d & Madison sts., Memphis, Tenn.
Robinson, William A.,
49 Drummond st., Auburn, Me.
Rockefeller, Lucius,
Palisade ave., Englewood, N. J.
Rogers, Arthur H.,
Geneseo, Livingston co., N. Y.
Rogers, Wiley,
15th & Chestnut sts., Louisville, Ky.
Rogers, William H.,
North st., Middletown, N. Y.
Rohde, Claus F.,
2d & Elm sts., Waseca, Minn.
*Rollins, John F.*,
Fort George, Duval co., Fla.
ROSENGARTEN, MITCHELL G.,
17th & Fitzwater sts., Philadelphia, Pa.
Rosewater, Nathan,
111 Water st., Cleveland, O.
Ross, Samuel P.,
Liberty ave. & McKee st., Houston, Tex.
Rudolf, Eliza,
Dryades & 2d sts., New Orleans, La.
Ruenzel, Henry G.,
753 3d st., Milwaukee, Wis.
Ruete, Theodore W.,
568 Main st., Dubuque, Iowa.
Rumsey, Samuel L.,
27 Pacific ave., Santa Cruz, Cal.
Runyon, Edward W.,
234 Sutter st., San Francisco, Cal.
Ruppert, John,
Hawthorn av.& Warsaw Pike, Cincinnati, O.
Rusby, Henry H.,
211 E. 23d st., New York, N.Y.
*Russell, Eugene J.*,
Army st. & Canton ave., Baltimore, Md.
Rust, William,
7 Peace st., New Brunswick, N. J.
Ryan, Frank G.,
3739 Brown st., Philadelphia, Pa.
Ryan, Henry,
Taftville, Conn.
Ryerson, Henry O.,
5 Main st., Newton, N. J.
SANDER, ENNO,
129 S. 11th st., St. Louis, Mo.
Sanderson, Stephen F.,
828 Nicollet ave., Minneapolis, Minn.
Sargent, Ezekiel H.,
125 State st., Chicago, Ill.
Sargent, Jesse W.,
252 Pleasant st.,' Malden, Mass.
Sauer, Louis W.,
927 Central ave., Cincinnati, O.
Sauerhering, Rudolph A.,
Main st., Mayville, Dodge co., Wis.
Saunders, William,
Central Experim. Farm, Ottawa, Ont., Can.
Sautter, Louis,
S. Pearl & Plain sts., Albany, N. Y.
Sawyer, William F.,
1152 Tremont st., Boston, Mass.
Sayre, Edward A.,
Seabury & Johnson, New York, N. Y.
Sayre, Eugene A.,
Glendale, Hamilton co., O.
Sayre, Lucius E.,
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Sayre, William H.,
Warner & Orange sts., Newark, N. J.
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Schafer, George H.,
713 Front st., Fort Madison, Iowa.
Schafhirt, Adolph J.,
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Scheffer, Emil,
173 Shelby st., Louisville, Ky.
Scheffer, Henry W.,
Care of Larkin & Scheffer, St. Louis, Mo.
Schellentrager, E. A.,
725 St. Clair st., Cleveland, O.
Scherer, Andrew,
381 E. Division st., Chicago, Ill.
Scherff, John P.,
Glenwood & Wash'tn aves, Bloomfield, N. J.
Scherling, Gustav,
1201 4th st., Sioux City, Ia.
Schieffelin, William J.,
170 William st., New York, N. Y.

Schiemann, Edward B.,
M & Walnut sts., Louisville, Ky.
Schlaepfer, Henry J.,
Main & 2d sts., Evansville, Ind.
Schley, Steiner,
16 W. Patrick st., Frederick City, Md.
Schlotterbeck, Julius O.,
13 Forest ave., Ann Arbor, Mich.
Schmid, Henry,
38 ave. A, New York, N. Y.
Schmidt, Carl,
1871 Pearl st., Brooklyn Village, O.
Schmidt, Ferdinand T.,
467 9th ave., New York, N. Y.
Schmidt, Florian C.,
71st st. & Cottage Grove ave., Chicago, Ill.
Schmidt, Frederick M.,
1558 Wabash ave., Chicago, Ill.
Schmidt, Valentine,
Polk & Jackson sts., San Francisco, Cal.
Schmitt, George J. F.,
507 W. Commerce st., San Antonio, Tex.
Schmitt, Joseph M.,
312 North ave., Rochester, N. Y.
Schmitter, Jonathan,
Maple st., Gypsum City, Saline co., Kan.
Schoenhut, Christie H.,
199 Superior st., Cleveland, O.
Schoettlin, Albert J.,
4th & Chestnut sts., Louisville, Ky.
Scholtz, Edmund L.,
16th & Stout sts., Denver, Col.
Schotel, John C.,
Railroad ave., Gloster, Amite co., Miss.
Schrader, Herman V. R.,
Tallahassee, Fla.
Schrank, C. Henry,
437 E. Water st., Milwaukee, Wis.
Schreck, Leo S.,
Liberty & John sts., Cincinnati, O.
Schueller, Ernst,
281 S. High st., Columbus, O.
Schueller, Frederick W.,
232 S. High st., Columbus, O.
Schulze, Louis,
631 S. Patterson Park ave., Baltimore, Md.
Schumann, Theodore,
Whitehall & Hunter sts., Atlanta, Ga.
Schurk, Louis,
3201 Olive st., St. Louis, Mo.
Schwab, Leslie W.,
460 E. 41st st., Chicago, Ill.
Schweikhardt, Richard,
Main & Ervay sts., Dallas, Tex.
Scott, Frank G.,
36 Euclid ave., Cleveland, O.
Scott, George T.,
Franklin Square, Worcester, Mass.
Scott, James M.,
381 W. Van Buren st., Chicago, Ill.
Scott, William H.,
1617 17th st., Richmond, Va.
Scoville, Charles H.,
Opp. the Lock, Tonawanda, Erie co., N. Y.
Scoville, Wilbur L.,
St. Botolph & Garrison sts., Boston, Mass.
Scribner, John C.,
Main st., Angel's Camp, Calaveras co., Cal.
SEABURY, GEORGE J.,
21 Platt st., New York, N. Y.
Searby, William M.,
859 Market st., San Francisco, Cal.
Sedberry, Bond E.,
Market Square, Fayetteville, N. C.
Seeman, Charles F.,
513 Royal st., New Orleans, La.
Seitz, Oscar,
102 Santa Fe ave., Salina, Kan.
Sempill, Walter M.,
135 Clark st., Chicago, Ill.
Sennewald, Ferdinand W.,
800 Hickory st., St. Louis, Mo.
Serodino, Herman,
53 Observatory st., Cincinnati, O.
Sevin, N. Douglas,
141 Main st., Norwich, Conn.
Shake, Homer C.,
125 Oliver ave., W. Indianapolis, Ind.
Shannon, Thomas R.,
143 Trumbull st., Hartford, Conn.
*Sharp, Alpheus P.*,
Pratt & Howard sts., Baltimore, Md.
Sharp, Harry,
202 Marietta st., Atlanta, Ga.
Sharples, Stephen P.,
13 Broad st., Boston, Mass.
Shaw, Robert J.,
3 E. Front st., Plainfield, N. J.
Shell, James L.,
Aberdeen, Miss.
Shelton, William A.,
Kansas& Howel av's, Marceline, Linn co, Mo.
Shelton, William C.,
Jerome st., Big Stone Gap, Va.

SHEPPARD, SAMUEL A. D.,
1129 Washington st., Boston, Mass.
Sherman, Charles R.,
1513 Dodge st., Omaha, Neb.
Sherwin, Eugene A.,
29 Stark st., Portland, Ore.
Sherwood, Louis W.,
45 W. Broad st., Columbus, O.
Shiels, George E.,
821 Broadway, New York, N. Y.
Shinn, James T.,
Broad & Spruce sts., Philadelphia, Pa.
Shoemaker, Richard M.,
4th & Race sts., Philadelphia, Pa.
Shreve, John A.,
Main st., Port Gibson, Miss.
Shriver, Henry,
53 Baltimore st., Cumberland, Md.
Shryer, Thomas W.,
111 Baltimore st., Cumberland, Md.
Shurtleff, Israel H.,
39 Elm st., New Bedford, Mass.
Siegemund, Charles A.,
1553 Washington st., Boston, Mass.
Siegenthaler, Harvey N.,
Kezar & Clifton sts., Springfield, O.
Siekman, Ivan F.,
73 S. Rampart st., New Orleans, La.
Simmon, Karl,
7th & Sibley sts., St. Paul, Minn.
Simms, Giles G. C.,
1344 New York ave., Washington, D. C.
Simon, William,
1348 Block st., Baltimore, Md.
Simons, Arthur H.,
Conneaut, O.
Simonson, William,
9th & Race sts., Cincinnati, O.
Simpson, Robert,
Hillsboro & Salisbury sts., Raleigh, N. C.
Simpson, William,
101 Fayetteville st., Raleigh, N. C.
Simson, Francis C.,
Halifax, N. Sco., Can.
Sippy, Alvin H.,
4013 Bell ave., St. Louis, Mo.
Skelly, James J.,
339 E. 14th st., New York, N. Y.
Slack, Henry R., Jr.,
East side Public Square, La Grange, Ga.
Slater, Frank H.,
P. O. Box 10, Mattawan, Monmouth co., N.J.
Sleuman, Charles A., Jr.,
159 Lamartine st., Jamaica Pl., Boston, Mass.
Sloan, George W.,
22 W. Washington st., Indianapolis, Ind.
Slocum, Frank L.,
170 Rebecca st., Allegheny, Pa.
Smink, William H. R.,
33 Market st., Shamokin, Pa.
Smith, A. Henry,
Decatur, Macon co., Ill.
Smith, Amasa D.,
142 Merrimack st., Manchester, N. H.
Smith, B. Frank,
2600 Indiana ave., Chicago, Ill.
Smith, Charles B.,
861 Broad st., Newark, N. J.
Smith, Clarence P.,
863 Broad st., Newark, N. J.
Smith, Edward N.,
95 Main st., Thompsonville, Hartf. co., Conn.
Smith, Edward S.,
Main st., Port Henry, N. Y.
Smith, Frank R.,
5th & King sts., Wilmington, Del.
Smith, George L.,
Liberal, Kan.
Smith, J. Hungerford,
19 Elm st., Rochester, N. Y.
Smith, John C.,
65 Margaret st., Plattsburgh, N. Y.
Smith, Joseph S.,
Akron, O.
Smith, Lauriston S.,
St. Augustine, Fla.
Smith, Linton,
Church & Bennett sts., Wilmington, Del.
Smith, Linville H.,
701 Centre st., Jamaica Pl., Boston, Mass.
Smith, Reuben R.,
198 9th ave., New York, N. Y.
Smith, Samuel W.,
182 Main st., Ansonia, New Haven co., Conn.
Smith, Theodric,
1343 Pennsylvania ave., Baltimore, Md.
Smith, Whitefoord G.,
31 Patton ave., Asheville, N. C.
Smith, Willard A.,
Main st., Richfield Springs, N. Y.
Smith, William C.,
14th & Market sts., Oakland, Al'meda co., Cal.
Smithson, David E.,
Caldwell, Ada co., Idaho.

Sniteman, Charles C.,
Neillsville, Clark co., Wis.
Snow, Charles W.,
214 Warren st., Syracuse, N. Y.
Snow, Herbert W.,
Care of McCormick & Lund, Omaha, Neb.
Snyder, Alva L.,
33 Court Square, Byran, O.
*Snyder, Ambrose C.*,
13½ St. Felix st., Brooklyn, N. Y.
Snyder, Robert J.,
2d & Market sts., Louisville, Ky.
Soetje, Edward C.,
434 S. Broadway, Denver, Col.
Sohn, Frank,
Grand & Easton aves., St. Louis, Mo.
Sohrbeck, G. Henry,
3d ave. & 16th st., Moline, Ill.
Sombart, John E.,
Coldwater, Comanche co., Kan.
Spalding, Warren A.,
19 Church st., New Haven, Conn.
Spangler, H. W.,
Perry, Jefferson co., Kan.
Spengler, John G.,
2d & Webster sts., Dayton, O.
Spenzer, Peter I.,
370 Central ave., Cleveland, O.
Sperry, Herman J.,
151 Chapel st., New Haven, Conn.
Spofford, Charles B.,
12 Tremont st., Claremont, N. H.
Squibb, Edward H.,
36 Doughty st., Brooklyn, N. Y.
Squibb, Edward R.,
36 Doughty st., Brooklyn, N. Y.
Squires, George B.,
109 Green st., Boston, Mass.
Stacey, Benjamin F.,
Thompson Square, Charlestown, Mass.
Staebler, Richard,
848 Broad st., Newark, N. J.
Stahler, William,
Main & Swede sts., Norristown, Pa.
Stahlhuth, Ernst H. W.,
5th & Washington sts., Columbus, Ind.
Stam, Colin F.,
Chestertown, Kent co., Md.
Stamford, William H.,
256 Mulberry st., Newark N. J.
Stanley, Edgar C.,
97 Franklin st., Auburn, N. Y.
Starr, Thomas,
313 9th ave., New York, N. Y.
Staudt, Louis C.,
15 S. Broadway, Aurora, Ill.
Stearns, Henry A.,
Care of Fred. Stearns & Co., Detroit, Mich.
Stebbins, Harry F.,
301 16th st., Denver, Col.
Stedem, Frederick W. E.,
Broad st. & Fairmount ave.,Philadelphia,Pa.
Steele, George R.,
Main & Prospect sts., Thompsonville,Conn.
Steele, James G.,
635 Market st., San Francisco, Cal.
Stein, Jacob H.,
801 Penn st., Reading, Pa.
Steinhauer, Frederick,
1539 Larimer st., Denver, Col.
Stendel, Guthardt,
640 Dryades st., New Orleans, La.
Stevens, Alonzo B.,
15 Church st., Ann Arbor, Mich.
Stevens, Fred. D.,
133 Woodward ave., Detroit, Mich.
Stevens, Luther F.,
141 Baltic st., Brooklyn, N. Y.
Stewart, Francis E.,
1204 Delaware ave., Wilmington, Del.
Stoff, Louis,
1180 2d ave., New York, N. Y.
Stone, Clarence G.,
580 Lafayette ave., Detroit, Mich.
Storck, Jacob A.,
Julia & Baronne sts., New Orleans, La.
Stoughton, Dwight G.,
204 State st., Hartford, Conn.
Stowell, Daniel,
1045 Washington st., Boston, Mass.
Strater, Henry H.,
1st st., Durango, Col.
Strathman, Charles A.,
El Paso, Woodford co., Ill.
Sumner, Alonzo,
51 Huntingdon ave., Boston, Mass.
*Sweeny, Robert O.*,
Duluth, St. Louis co., Minn.
Sweet, Caldwell,
22 W. Market Square, Bangor, Me.
Tailby, Joseph A.,
Linden st., Wellesley, Mass.
Tartiss, Alfred J.,
39 Johnston st., Newburgh, N. Y.

*Taylor, Alfred B.*,
2538 N. 6th st., Philadelphia, Pa.
Taylor, Celia W.,
Main & Center sts., Loomis, Mich.
Taylor, George A.,
42 Railroad st., Methuen, Mass.
Taylor, John P.,
99 3d st., New Bedford, Mass.
Taylor, Thomas L.,
Custer City, S. Dak.
Taylor, Walter T.,
709 Dauphine st., New Orleans, La.
Thatcher, Hervey D.,
12 Market Square, Potsdam, N. Y.
Thomas, Oscar E.,
164 Main st., Columbia, S. C.
Thomas, Robert, Jr.,
Broad st., Thomasville, Ga.
Thomasson, Anders,
277 Central st., Lowell, Mass.
Thompson, Frank A.,
Care of Parke, Davis & Co., Detroit, Mich.
Thompson, James H.,
630 Tremont st., Boston, Mass.
*Thompson, William B.*,
4804 Trinity Place, W. Philadelphia, Pa.
Thompson, William S.,
703 15th st., Washington, D. C.
Thompson, William S.,
717 E. Baltimore st., Baltimore, Md.
Thomsen, John J., Jr.,
16 W. Madison st., Baltimore, Md.
Thorn, Henry P.,
Main st., Medford, N. J.
Thurber, Almon R.,
648 S. Pennsylvania ave., S. Denver, Col.
Thurston, Azor,
Grand Rapids, Wood co., O.
Tiarks, Hermann,
First st., Monticello, Ia.
Tiernan, Frank M.,
Mansion House, Roselle, N. J.
Tigner, James O.,
Greeneville, Meriwether co., Ga.
Tilden, A. K.,
Boston, Mass.
Tobey, Charles W.,
302 Market st., Troy, O.
Tobin, John M.,
341 5th ave., New York, N. Y.
Todd, Albert M.,
204 N. Rose st., Kalamazoo, Mich.
Tomfohrde, Charles W.,
1827 Cass ave., St. Louis, Mo.
Tomfohrde, John W.,
Benton & 22d sts., St. Louis, Mo.
Topley, James,
166 Georgia st., Vallejo, Solano co., Cal.
Torbert, Willard H.,
756 Main st., Dubuque, Ia.
Tracy, David W.,
139 Main st., Hartford, Conn.
Travis, J. Walton,
Norwich, Conn.
Travis, Miles B.,
Saybrook, McLean co., Ill.
Treat, Joseph A.,
Stuart, Guthrie co., Ia.
Trimble, Henry,
145 N. 10th st., Philadelphia, Pa.
Truax, Charles,
81 Randolph st., Chicago, Ill.
Trudel, Jacques J.,
60 Friend st., Amesbury, Mass.
Tscheppe, Adolph,
1010 4th ave., New York, N. Y.
Tucker, Greenleaf R.,
Boston City Hospital, Boston, Mass.
Tucker, Mosely F.,
Dauphin & Hamilton sts., Mobile, Ala.
TUFTS, CHARLES A.,
85 Washington st., Dover, N. H.
Tuma, Bruno,
11 Camp st., New Orleans, La.
Turner, George H.,
296 S. Pearl st., Albany, N. Y.
Turner, Isaac W.,
92 Bowery, Palma House, New York, N. Y.
*Turner, T. Larkin*,
East Weymouth, Mass.
Tyner, George O.,
Marietta & Broad sts., Atlanta, Ga.
Uhlich, Ferdinand G.,
1401 Salisbury st., St. Louis, Mo.
Upson, Rosa,
Marshalltown, Marshall co., Ia.
Urban, Jacob P.,
336 Ontario st., Cleveland, O.
Valliant, George E.,
720 Main st., Pine Bluff, Ark.
Van Antwerp, Andrew,
Dauphin & Royal sts., Mobile, Ala.
Van Antwerp, Garet,
71 Dauphin st., Mobile, Ala.

Van Auken, Jerrie A.,
125 Main st., Gloversville, N. Y.
Van Patten, W.,
Burlington, Vt.
Van Winkle, Abraham W.,
35 Clinton ave., Newark, N. J.
Vargas-Heredia, Jorge,
474 Columbus ave., Boston, Mass.
Varney, Edward F.,
39 Tremont st., Boston, Mass.
Vaughan, Parry W.,
Main st., Durham, Orange co., N. C.
Vennard, William L.,
91 Fulton st., New York, N. Y.
*Vernor, James,*
235 Woodward ave., Detroit, Mich.
Viallon, Paul L.,
Park & Front sts., Bayou Goula, La.
Vilter, Hermann T.,
76 McMicken ave., Cincinnati, O.
Vogt, John G.,
2837 Dickson st., St. Louis, Mo.
Vordick, August H.,
Jefferson ave. & Benton st., St. Louis, Mo.
Voss, George W.,
680 Woodland ave., Cleveland, O.
Wagner, Henry,
9th & Linn sts., Cincinnati, O.
Wagner, William I.,
Jackson, Ga.
Wakefield, Seth D.,
114 Lisbon st., Lewiston, Me.
Walbrach, Arthur,
230 15th st., Denver, Col.
Walker, Anselle,
Main st., Freehold, N. J.
Walker, Charles W.,
171 E. Haverhill st., Lawrence, Mass.
Walker, John P.,
Main st., Freehold, N. J.
Walker, William I.,
74 State st., Albany, N. Y.
Wall, Otto A.,
2111 Columbus st., St. Louis, Mo.
Walton, Joseph R.,
1921 Pennsylvania ave., Washington, D. C.
Wangler, Conrad D.,
227 E. 4th st., Waterloo, Ia.
Ward, Charles A.,
P. O. Box 460, Stoneham, Mass.
*Wardell, Robert C.,*
Residence unknown.

Warn, William E.,
1st st., Keyport, N. J.
*Warner, William R,*
1228 Market st., Philadelphia, Pa.
Warren, Edwin A.,
400 Sibley st., St. Paul, Minn.
Warren, William M.,
210 E. Congress st., Detroit, Mich.
Washburn, Harry M.,
823 Kansas ave., Topeka, Kan.
Watson, Herbert K.,
803 Market st., Wilmington, Del.
Watson, Sidney P.,
Atlanta, Ga.
Watson, William S.,
25 Peachtree st., Atlanta, Ga.
Waugh, George J.,
Ontario st., Stratford, Ont., Can.
Wearn, William H.,
Trade & Tryon sts., Charlotte, N. C.
Weaver, John A.,
332 Northampton st., Easton, Pa.
Webb, William H.,
556 N. 16th st., Philadelphia, Pa.
Webber, J. Le Roy,
Care of Sharp & Dohme, Baltimore, Md.
Weber, Eugene,
445 N. Clark st., Chicago, Ill.
Weeks, B. Frank,
597 E. 3d st., Cincinnati, O.
Wehrly, Thomas M.,
3d & H sts., N. E., Washington, D. C.
Weidemann, Charles A.,
2148 Green st., Philadelphia, Pa.
Weinman, Oscar C.,
173 7th ave., New York, N. Y.
Weiser, Emilius I.,
5 Water st., Decorah, Ia.
Welch, Willard C., Jr.,
2115 Bush st., San Francisco, Cal.
Wellcome, Henry S.,
8 Snow Hill, London, England.
Wells, Ebenezer M.,
5th & Main sts., Forth Worth, Tex.
Wendel, Henry E.,
3d & George sts., Philadelphia, Pa.
Wenzell, William T.,
322 Polk st., San Francisco, Cal.
Werner, Rudolf C.,
2592 Atlantic ave., Brooklyn, N. Y.
West, Charles A.,
99 Broad st., Mass. Boston,

Westcott, James W.,
421 N. Charles st., Baltimore, Md.
Westmann, F. H.,
2744 Cass ave., St. Louis, Mo.
Wetherell, Albert S.,
122 Water st., Exeter, N. H.
Wetterstroem, Albert,
435 Colerain ave., Cincinnati, O.
Weyer, John,
Norwood, Hamilton co., O.
Whall, Joseph S.,
82 Hancock st., Quincy, Mass.
Wharton, John C.,
Vine & Church sts., Nashville, Tenn.
Wheat, E. M.,
Broad st., Columbus, Ga.
Wheeler, C. Gilbert,
143 Lake st., Chicago, Ill.
Wheeler, William D.,
W. Chester Park & Beacon st., Boston, Mass.
Whelpley, Henry M.,
2342 Albion Place, St. Louis, Mo.
Whitcomb, Frederick E.,
Broadway & Olive sts., St. Louis, Mo.
WHITE, AARON S.,
59 High st., Mt. Holly, N. J.
White, George H.,
Newark & Jersey aves., Jersey City, N. J.
White, Richard E.,
400 Hayes st., San Francisco, Cal.
White, William H.,
2320 4th st., Meridian, Miss.
WHITFIELD, THOMAS,
240 Wabash ave., Chicago, Ill.
Whiting, Frederick T.,
Main st., Great Barrington, Mass.
Whitman, Nelson S.,
175 Main st., Nashua, N. H.
Whitney, Henry M.,
297 Essex st., Lawrence, Mass.
Wichelns, Frederick,
192 Greenwich st., New York, N. Y.
Wickham, William H.,
91 Fulton st., New York, N. Y.
*Wiegand, Thomas S.*,
145 N. 10th st., Philadelphia, Pa.
Wienges, Conrad,
649 Jersey ave., Jersey City, N. J.
Wight, Oscar M.,
Lexington st., Independence, Mo.
Wilcox, Frederick,
Apothecaries' Hall, Waterbury, Conn.
Wilder, George P.,
N. Park st., Lebanon, N. H.
Wilkes, Arthur P.,
Selby ave. & Grotto st., St. Paul, Minn.
Willett, G. Howard,
701 Walnut st., Kansas City, Mo.
Williams, Benjamin C.,
Wilson, St. Croix co., Wis.
Williams, Charles F.,
Main st., Thomaston, Conn.
Williams, Duane B.,
16 Lincoln Square, Worcester, Mass.
Williams E. M.,
Myers, Fla.
Williams, George G.
P. O. Box 3551, Boston, Mass.
Williams, John K.,
391 Main st., Hartford, Conn.
Williams, Richard W.,
Notre Dame st., Three Rivers, Quebec, Can.
Williams, Seward W.,
8 Brighton ave., East Orange, N. J.
Williams, William H.,
659 Main st., Wheeling, W. Va.
Willis, John B.,
Waverly, Ala.
Wills, Fred. M.,
323 Main st., Charlottesville, Va.
Wilson, Benjamin O.,
28 Merchants' Row, Boston, Mass.
Wilson, Charles F.,
2841 Gamble st., St. Louis, Mo.
Wilson, Frank M.,
133 Main st., Willimantic, Conn.
Wilson, William,
106 Broadway, New York, N. Y.
WINKELMANN, JOHN H.,
Liberty & German sts., Baltimore, Md.
Winnberg, John M.,
200 Main st., Jamestown, N. Y.
Winter, Jonas,
202 Prospect st., Hagerstown, Md.
Winters, John H.,
New Canaan, Conn.
Wolfe, Nathaniel,
Wilkes-Barre, Pa.
WOLTERSDORF, LOUIS,
171 Blue Island ave., Chicago, Ill.
Wood, Alonzo F., Jr.,
2 Church st., New Haven, Conn.
Wood, Edward S.,
14 Chauncey st., Cambridge, Mass.

Wood, George M.,
20 Broad st., Bloomfield, N. J.
Wood, James P.,
2 Church st., New Haven, Conn.
Wood, Mason B.,
P. O. Box 58, East Providence, R. I.
Woodruff, Roderick S.,
91 Blank st., Waterbury, Conn.
Wooldridge, Daniel T.,
9 Morgan st., Boonville, Mo.
Wooldridge, Napoleon,
Bay & Julia sts., Jacksonville, Fla.
Woolley, Stephen D.,
Asbury Park, N. J.
Wray, George B.,
P. O. Box 721, Yonkers, N. Y.
Wright, Albert F.,
1355 Washington st., West Newton, Mass.
Wright, Edward E.,
82 Maxfield st., New Bedford, Mass.
Wunderlich, Edward,
396 Dryades st., New Orleans, La.
Wurmb, Theodore H.,
1923 E. Grand ave., St. Louis, Mo.
Yeager, Alvin A.,
134 Gay st., Knoxville, Tenn.
Yocum, A. L.,
Chariton, Ia.
YORSTON, MATTHEW M.,
429 Central ave., Cincinnati, O.
Young, John K.,
P. O. Box 235, Bristol, Pa.
Youngs, William,
114 Park ave., Rich Hill, Mo.
Zahn, Emil A.,
1801 State st., Chicago, Ill.
ZEILIN, J. HENRY,
306 Cherry st., Philadelphia, Pa.
Zellhoefer, George,
Broadway & Hart st., Brooklyn, N. Y.
Ziegler, Philip M.,
526 Penn st., Reading, Pa.
Zimmer, Harry E.,
78 E. Washington st., Indianapolis, Ind.
Zimmerman, Charles,
423 S. Adams st., Peoria, Ill.
Zoeller, Edward V.,
Main st., Tarboro, N. C.
Zuenkeler, J. Ferd.,
686 Vine st., Cincinnati, O.
Zwick, George A.,
11th st. & Madison ave., Covington, Ky.

# LIST OF RESIGNATIONS.

Armstrong, Andrew M.
Baltzly, Albert B.
Buehler, John J.
Carpenter, Samuel W.
Clapp, George H.
Cook, Harry C.
Dana, Edmund, Jr.
Davis, Benjamin.
Denham, Charles S.
Drefs, Charles A.
Eberhardt, E. G.
Edie, John B.
Evans, Samuel B.
Fahlen, Julius.
Galloway, David H.
Goodman, Emanuel.
Goodwin, Eugene R.
Graham, Willis H.
Gray, Gilbert D.
Hanson, Willis T.
Hastings, Benjamin.
Hilt, David.
Holden, Isaac D.
Holt, Alvin E.
Hulting, Fred. B.
Ingram, Wm. F.
Kalusowski, Henry E.
Kellogg, Gardner.
Kennedy, James.
Kleinschmidt, Augustus A.
Knox, Edwin H.
Laue, John M. A.
Ludlow, Charles.
Martin, S. Robert.
McKelway, George I.
Menkemeller, Charles.
Moore, Thomas F.
Palmer, J. Dabney.
Panknin, Charles F.
Pfingst, Henry A.
Post, Elisha.
Rapp, F. Walton.
Rockey, Walter S.
Roehrig, Albert M.
Schaaf, Justus H.
Schermerhorn, Winfield S.
Scott, William J.
Scull, James H.
Snyder, De Witt C.
Stierle, Adolph.
Stone, Marion M.
Stone, Maurice L.
Stratton, Richard H.
Vandegrift, John A.
Walch, Robert H.
Wells, Romanta.
Wheeler, Leonard H.
Wright, Charles L.

# LIST OF DECEASED MEMBERS.

Since the last meeting, notice of the death of the following members has been received:

| | | |
|---|---|---|
| Babo, Leopold, | Boston, Mass. | Elected 1859 |
| Bassett, Joseph, | Salem, N. J. | " 1880 |
| Bedford, P. W., | New York, N. Y. | " 1859 |
| Chamberlain, Guilford T., | St. Louis, Mo. | " 1853 |
| Hohenthal, Chas. F. L., | New York, N. Y. | " 1865 |
| Ink, Parker P., | Orlando, Fla. | " 1888 |
| Kennedy, Ewen C., | Jersey City, N. J. | " 1888 |
| Soubeiran, Dr. J. L., | Montpellier, France. | " 1871 |
| Steele, Henry, | San Francisco, Cal. | " 1859 |
| Strassel, William, | Louisville, Ky. | " 1870 |
| Thomsen, John J., | Baltimore, Md. | " 1856 |
| Trask, Charles M., | White River Junction, Vt. | " 1875 |
| Vogt, Diedrich, | Charleston, S. C. | " 1889 |
| Wells, Jacob D., | Cincinnati, O. | " 1864 |
| Wheeler, Lucien F., | Waldo, Fla. | " 1858 |
| Wright, Archibald, | Philadelphia, Pa. | " 1868 |

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# LIST OF MEMBERS DROPPED FROM THE ROLL, IN COMPLIANCE WITH CHAPTER VIII., ARTICLE III., OF THE BY-LAWS.

(SEE PRESENT VOLUME, PAGE 50, MINUTES OF THE COUNCIL.)

Allen, William H.
Aman, Henry.
Anderson, Jesse N.
Ashbrook, Charles S.
Berringer, Will J.
Butler, George F.
Chandler, I. Eugene.
Day, Charles W.
Deitz, Charles J.
Dodge, Horace T.
Dufour, Clarence R.
Fischer, Emil A.
Frizelle, Seymour F.
Grant, Albert W.
Grosse, Gottlieb M.
Grove, John E.
Haber, Louis A.
Heller, Marx M.
Labold, Joseph M.
Maynard, Henry S.
McFarland, Thad. D.
Miller, William.
Norwood, Theodore F.
Parker, John H.
Richardson, William A.
Rickey, Charles F.
Rohlfing, Charles H. F.
Rometch, Frederick.
Schambs, George M.
Seykora, Edward J.
Shrader, John L.
Slosson, Frank W.
Smith, Willard.
Stevens, S. Henry.
Stollenwerck, Alphonse L.
Strachan, William E.
Thompson, James L.
Tibbs, William H.
Wagner, George W., Jr.
Walton, Harry C.
Weills, Wm. M. L.
Zinck, Charles M.

# INDEX.

## B.

C.

## D.

G.

P.

Q.



R.



S.

## T.

U.



V.



W.



X.

Y.



Z.

~~Ru643~~

1 gal

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